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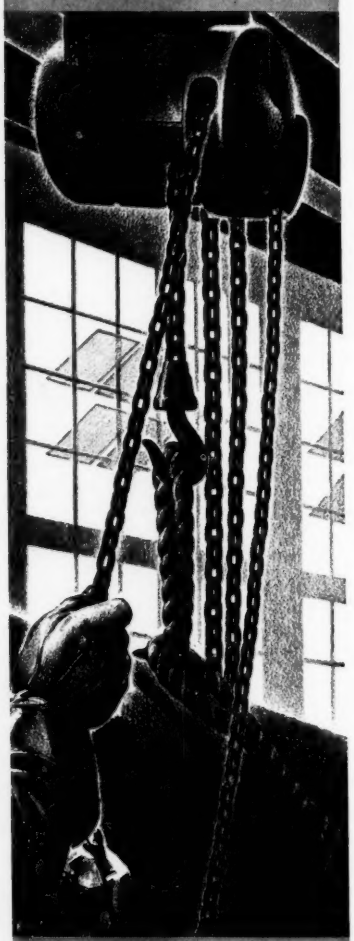

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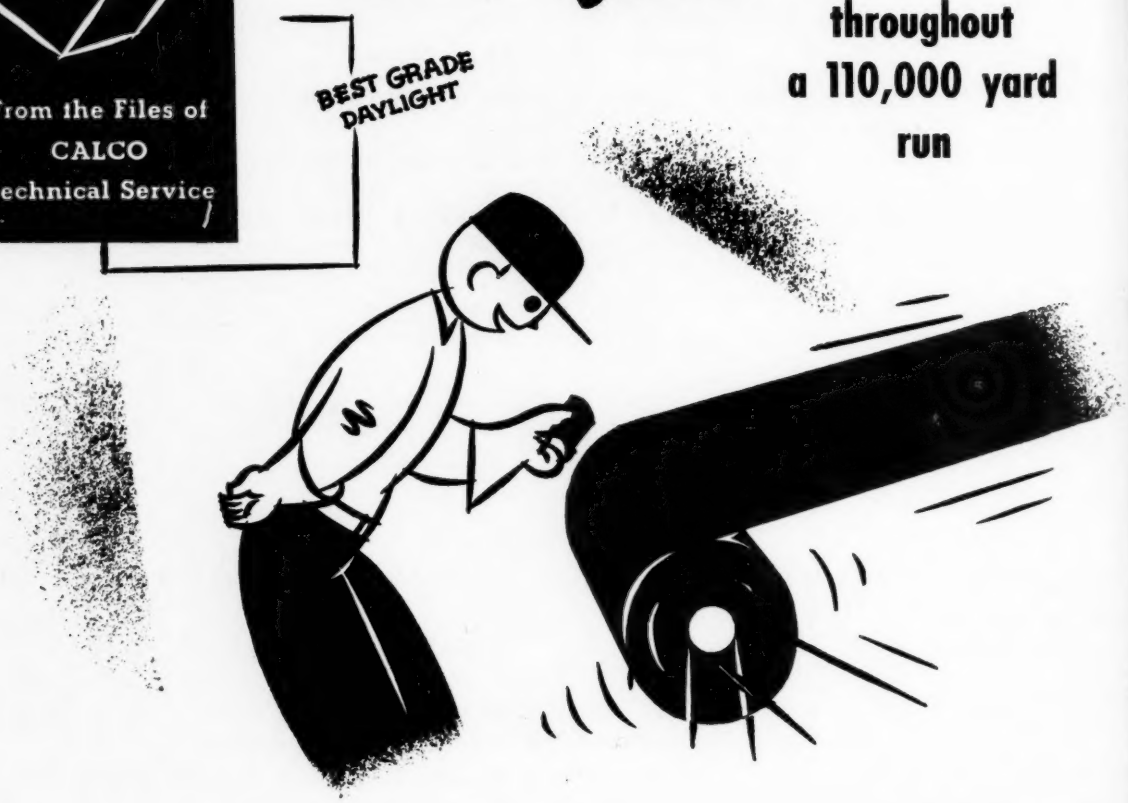

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AMERICAN
DYESTUFF REPORTER

VOLUME 27 JUNE 13, 1938 NUMBER 12

Recent Theories on the

Felting of Wool

HERMAN BOXSER

THE structure and chemical nature of the wool fiber has been a recent subject of most intensive research in the investigations of textile fibers in England and also in this country. With the chemistry of proteins being so minutely investigated, as it is at present, it is only natural that a typical protein substance like wool, one of nature's abundant raw materials, should be one of the general groups of proteins, which has found its proper place for research. This study of proteins, with the interesting observations which have already been divulged, has accentuated the importance of proteins in industry as well as in medicine. The disclosures resulting from the investigations of wool, have offered more clarifying explanations for the felting or milling phenomenon of the wool fiber. In the following paragraphs, we will attempt to enumerate the latest experimental work which has been done along these lines, with the conclusions which have been drawn therefrom.

For many years, as we well know, the theory was accepted that under the influence of pressure, moisture, and heat, wool fibers were forced into intimate contact, and retained in this position by the interlocking of the scales of the neighboring fibers. It was in the twenties that this theory was questioned with the advancement of new viewpoints as to what occurred in the felting of wool.

Although Shorter[1] still held to the scale structure theory as being a partial explanation for felting, he did conclude, however, that other factors were present besides scale structure. He felt that milling was primarily due to the fact that a wool fabric under suitable conditions of fiber contact, and induced by moisture of milling agents, became a collection of self-tightening mechanisms, i.e., mechanisms whereby the haphazard external forces acting on the fabric were transformed so as to produce a consistently consolidating effect. In greater detail, we may follow Shorter's theory as follows:—

Let us assume that due to the presence of moisture and milling agents, the conditions of fiber contact were such that the direction of the scales played an important part in determining the resistance to the sliding motion of one fiber over another. Thusly, in considering a single fiber in the midst of other fibers with which it is entangled at different points along its length, we may conclude that these entanglements fall into two classes:—

(1) Those which are so tight that no motion is possible.

(2) Those in which there is sufficient freedom for the fiber to move. This would be in the direction of the root end, which would be that direction favored by the serrations.

If a fiber has entanglements of this second class along its length, in the same token, only casual disturbances would cause it to travel as a whole through the fabric. In general, however, a fiber will have entanglements of both classes;—it will be held tightly at certain places, and free to creep at others. The former condition may be referred to as a "place of complete entanglement" and the latter "a place of partial entanglement."

The direction of the scales on the fiber will be such that two cases will exist. (a) Some will point towards places of complete entanglements and (b) others will point towards places of partial entanglements.

In case (a) casual disturbances will tend to cause the fiber to creep so as to diminish the length between the entanglements, thereby tightening up automatically this length of fiber. Any temporary deformation of the fabric which brings the two entanglements closer together will allow further creeping to occur, so that when the external force producing the deformation is removed, the two entanglements will not separate to quite their original distance. There is thus a permanent local consolidation of the fabric.

In case (b) casual disturbances will lead to an increase of the length of fiber between the two entanglements. If the fiber were a rigid rod this would tend to produce a local extension of the fabric. Owing, however, to the lack of rigidity of the fiber, it merely loops, and becomes entangled with other fibers.

Shorter, therefore, advanced two fundamental factors in fulling, (1) uni-directional freedom of motion due to the serrations on the fiber, (2) lack of appreciable flexural rigidity of the fiber. The action of moisture and fulling

agents were such as to produce conditions of fiber contact favoring the operation of factor one.

The previously described looping action cannot be regarded as exerting direct fabric consolidating effect by true felting, but only adds to the complexity of the fiber arrangement.

Shorter's theory differs from the "interlocking scales" theory in two respects: (1) It postulates uni-directional freedom, not absolute fixity, as the characteristic effect produced by the scales. (2) This uni-directional freedom involves the scales on the entangled fiber, not those on the entangling fibers.

In 1931, Speakman and Stott[2] felt that the interlocking scale theory should be abandoned because microscopical examination of a milled fabric failed to reveal fibers showing the intimate scale contact as had been postulated. From Shorter's theory of fiber travel in the direction of the root ends, Speakman and Stott concluded that the rate of shrinkage of a fabric in a fulling mill should be determined by the magnitude of difference between frictional resistance to the motion of a fiber in the direction of the root end and that in the direction of the tip, the friction being greater in the latter instance.

Both of these investigators, therefore, devised an instrument for measuring this resistance to friction as an evaluation of the feltability of various wools. It would be indicative of scaliness, which should be in direct proportion to the felting efficiency of wools of varying fiber lengths and fineness.

Their research indicated that the felting of wool was dependent not only upon the scaliness of the fiber but also on other factors,—the ability of wool to swell in water and in various milling agents, as well as its ability to recover from a state of strain during fulling. This was to be appreciated as the rate of shrinkage of wool was found to be least in water (i.e., in its iso-electric range), but its shrinkage would increase with an increase in the acidity or alkalinity of the milling agent. It was evident that fiber swelling produced accentuated scaliness inasmuch as when wool fibers are immersed in water there is increased scale projection. Although surface scales might be essential for fulling, the different fulling properties of various wools were not determined solely by different degrees of scaliness, but were influenced by other factors such as fiber length, fineness, crimpness, and of prime importance,—the milling conditions. The latter would include temperature and milling agents used.

Speakman, Stott and Chang[3] correlated the fact that the maximum swell of wool occurred in a sulfuric acid solution of pH 0.5 on the acid side, and a maximum also took place in a sodium carbonate solution of pH 10.0 on the alkaline side, with the fact that the maximum shrinkages of wool cloth occurred at pH 10.5 and pH 1.50 and under. This showed a distinct relationship between shrinkage or felting and swelling of a wool fiber.

In noting the effect of temperature on the swelling of wool fibers, Speakman, Stott, and Chang found that as the temperature was raised, so did the swelling of the fibers decrease, but beyond 37° C. swelling commenced to increase. Harrison[4] had found that the rate of milling shrinkage, using soap, as well as sulfuric acid solution, first increased with a rise of temperature and then beyond 46-49° C. fell. This would indicate from a temperature standpoint, that an increased rate of milling would be accompanied by decreased swelling, and vice versa; whereas according to the present experimental results, an increase in acidity or alkalinity of the milling agent caused increased swelling and was accompanied by an increased rate of shrinkage. This contradiction was important in proving that swelling itself did not determine the milling properties of wool, although under particular conditions it may be directly related to the factor which was immediately involved.

Further experiments with fulling definite areas of woolen cloths at varying temperatures proved that the maximum shrinkage occurred at 45° C. Beyond this temperature, the rate of shrinkage decreased. To prove this point further, the following experiment was conducted:—

It is known that at any given pH, the swelling of proteins in hydrochloric acid solutions is reduced by the action of sodium chloride. The use of this property was made to study the rate of shrinkage of fabrics in media of the same pH, but in the presence and absence of NaCl, i.e., presence and absence of osmotic swelling. The results showed that although salt has the property of depressing any swelling, its presence increased the rate of shrinkage as shown by the following table:—

TABLE I

Milling Agent	*pH*	*Percentage Shrinkage in Area* 1 *Hr.*	2 *Hrs.*	3 *Hrs.*	4 *Hrs.*
HCl	1.88	3.2	5.9	11.2	13.5
HCl + NaCl..	2.06	3.3	6.5	13.3	17.0
HCl + NaCl..	1.74	5.4	9.6	17.0	22.2

It was concluded, therefore, that the rate of milling shrinkage in wool fibers was not due to the change in the swelling of the fibers. It was necessary to examine the elastic properties of wool in acid and alkaline solutions.

The elasticity as well as plastic properties of wool had previously been studied by Speakman[5]. In regarding the physical structure of the wool fiber, it was assumed that there existed two distinct structures arranged in parallel,—(1) the cell wall, and (2) its enclosed fibrillar structure. Wool fibers in water were imperfectly elastic owing to the plasticity and the rupture of the fibrillae within the constituent walls. The fibrillar plasticity of wool in water was due to hydrolytic changes associated with the peptide linkages. And finally, the plasticity of wool could be reduced by those reagents which combine with the amino groups, which reduced their affinity for water, while inhibiting the hydrolysis of the peptide linkages.

In a further investigation of the elastic properties of wool at high temperatures, Speakman[6] concluded that an increase of temperature increased the tendency of the fibers

to assume a permanent set in two ways,—(1) by increasing the plasticity of the fibrillar structure and (2) by impairing the perfect elasticity of the cell wall structure. It was found that up to 90° C., strained wool would return to its original length. This was explained by the assumption that the outer cell wall still exhibited perfect elasticity at this temperature. However, true permanent set was realized in water above 90° C., when the cell wall became imperfectly elastic, which created frictional forces between it and the inner fibrillar structure, which opposed any tendency of the fiber to return.

It is interesting to note that later researches showed that too great a plasticity of wool opposed rather than aided its felting properties.

Speakman and Hirst[7] had found that the extensibility of wool was least between pHs of 4 and 8. Similarly, Speakman, Stott and Chang[3] had noted that the rate of shrinkage of wool was least between these same two pHs. This explained why agents such as the Igepons and Gardinols which gave a pH of 6.5 are not recommended as fulling agents. This set up a parallel between ease of extension, temperature, and the milling shrinkage properties of wool.

Further explanation, however, was needed for the fact that while wool extension increased with pHs above 10, milling shrinkage decreased above this pH. Analogously, while the extension of wool is greater above 45° C., its milling shrinkage dropped beyond this temperature.

The explanation was found in the "recovery from extension" theory. During felting, the fibers of wool entangled in cloth will be stretched amid loose entanglements. On release, the stretched fibers will attempt to return to their original length drawing loose entanglements with them. Using this theory it was explained why wool would not shrink as rapidly beyond 45° C. Above this temperature the power of recovery diminishes. Experiments with human hair demonstrated clearly that the critical temperature for milling was 45° C. as beyond this temperature, the increasing rate of extension was overwhelmed by a decreasing power of recovery from extension.

In line with the above theory, in an alkaline solution beyond pH 10.7, wool also loses its power of recovery from extension. In comparing acids with alkalies, it was found that acids did not impair this power as much as alkalies, since at pH 1.06, acid did not diminish the power of contraction to any marked extent.

The effect at a low pH of an acid such as hydrogen peroxide upon the felting properties of wool has been reported by Brown[8]. He described an industrial process in Germany wherein enhanced feltability is produced in hydrogen peroxide solutions of pHs of 1 to 2. This solution, of course, is far different from the usual neutral or weakly alkaline bath commonly used for bleaching wool. In this process a 0.15 per cent solution of hydrogen peroxide is utilized, which acts for six to eight hours at 20° C. in the presence of a metal catalyst.

The writer has questioned the production of a pH of 1 to 2 with a 0.15 per cent solution of even 100 volume H_2O_2 inasmuch as this can only be attained with a strength of 4 per cent to 5 per cent of the 100 volume peroxide. It might be possible that the metal catalyst is the factor which appreciably lowers the pH of the 0.15 per cent strength to a pH of 1 to 2.

Experiments have further shown that soap is a far more effective fulling agent than alkali at the same pH. This is obvious, since fiber travel, as well as the stretching and contraction of fibers must be opposed by frictional resistance with the neighboring fibers in cloth, this resistance being minimized by a lubricant like soap, which will facilitate shrinkage. The very chemical composition of soap and the fact that it is strongly adsorbed by wool, besides its lubricating powers, demonstrates its superiority as a milling agent.

Speakman, Stott and Chang[3] postulated that for milling to be possible, a fiber must

(1) Possess a surface scale structure.

(2) Be easily stretched and deformed.

(3) Possess the power of recovery from extension.

King[9] has discussed the theory of felting based on the supposition that there is an attack on the structure of the wool fiber. According to his views, the stretching of the wool fiber, which is fundamental to fulling, is due to the straightening out under tension of the coiled or wavy molecular chains which extend lengthwise of the fiber. These chains are held in their folded positions by cross linkages between those chains which adjoin. These offer resistance to stretching and exert forces for recovery.

These linkages in turn, are broken with an increase in alkalinity, but at the proper pH, the breakdown, which allows easier stretching, is carried only to a point where there is still a sufficient recovery force to perform its part of the process.

Before proceeding further, it would be well to consider the chemical structure of wool. Figure 1 shows the structural formula of stretched keratin as outlined by King.

It has been generally accepted that the sulfur linkage plays a significant part in shrinkage effects, i.e., in felting. Wool is known to vary in sulfur content, but whether this variability has any significance concerning wool properties still lacks proof.

An early theory was that the cystine linkages gave stability to the network of the molecular structure of wool, enabling chemical reactions to take place in other parts of the structure. If the cystine links broke down, disintegration of the fiber substance followed.

It has long been known that wool is vulnerable to alkalies and that it is the sulfur group which is the point of attack. This was found to be true by Harris and Smith[10] who concluded that the main point of attack on wool by both oxidizing and alkaline reagents was the disulfide group of the cystine in wool. On this basis, it has been argued, that the synthetic wool, lanital, is superior

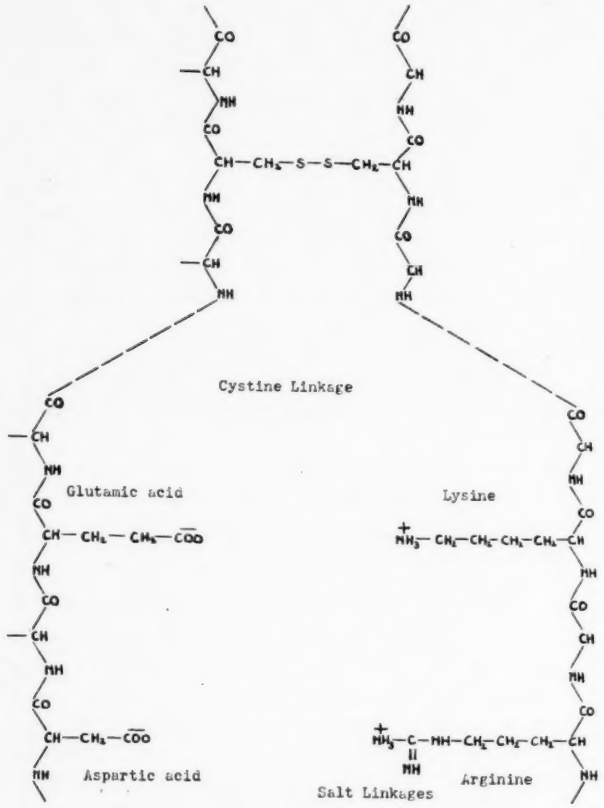

Figure 1—Structural Formula of Stretched Keratin (King).

because it contains a very much lower sulfur content than wool.

According to a later report from King[11] the above contentions are not correct, for the cystine link can be broken without disintegration of the fiber substance, and it is this breakdown which is fundamental to felting. Wool, then, owes this unique property to its sulfur content.

The attack on the cystine linkings of wool has been the basis of an interesting English patent (E. P. 456,336)[12] for producing curl fabrics, removal of distortion in knitted fabrics, and also for the permanent waving of wool. The process consists of disrupting the cystine link of the keratin, and thereby relieving stress in the fiber by treating the fibers or fibrous materials at temperatures below 100° C. and at a pH of about 6, with bisulfites or compounds capable of yielding bisulfites. It is claimed that at 60° C., the disruption is followed by the rapid formation of fresh linkings, resulting in the fibers becoming stabilized in the formation, they possessed when treated,—in other words, they are made to assume a set. After this treatment, the material is subjected to an aqueous solution of an aldehyde or ketone and an oxidizing agent. The set may be improved by treating the hair with a solution of an inorganic salt like calcium nitrate.

Referring back to the structural lattice shown in Figure 1, we see that there exists two kinds of linkages holding the long peptide chains together in a coherent network, (1) the cystine linkage and (2) the salt linkages formed within the so-called "stability range." This is a sort of internal combination and neutralization between the carboxyl—COOH—and, amino—NH_2—groups which terminate the side chains, i.e., between the glutamic acid and lysine side chains.

King's view is that if such chemical treatment is applied that both kinds of linkages disrupt completely, then the whole structure goes. But it has been realized that either type can be modified without affecting the other, and without any disruption of the fiber substance.

The above lattice as outlined can be considered to represent wool in the stretched form—beta keratin. In its normal state—alpha keratin—the long chains are in a coiled or hunched condition. The cross linkage act as a brake against extension and exert a contracting influence when the stretching force is removed. If all the linkages are intact the fiber is in the condition most difficult to stretch, and of most powerful recovery after stretching. If any of these links give way, the fiber then becomes easier to stretch and will exhibit diminished power of recovery. If these so-called "tie bands" get undone to a sufficient extent so that the long chains can coil themselves in a more hunched-up position than in normal wool,—then we get super-contraction. On this basis, fabrics can be made to undergo a linear contraction of as much as 30 per cent of their original length.

Wool is an amphoteric colloid; it will combine under suitable conditions either with an acid or an alkali. Its iso-electric point (point of minimum reactivity) as stated previously by Speakman, is not a sharp point but a range of stability between pH 4 and pH 8. Within this range, it possesses its maximum physical rigidity, and all its cross linkages remain intact. Wool felts least in this range,—naturally—because it is not sufficiently extensible at this point. It can only be made more extensible by a breakdown of one or the cross linkages. On the acid side we undo the salt linkages,—on the alkaline side we undo the cystine linkage.

King (ibid) made a laboratory apparatus to produce a great number of slight local extensions and releases in a wool fabric with very interesting results. His experiments showed that the "positive stretch" method, as he named it, gave more lattitude to the drawing together effect without the boardy felted base which is produced in ordinary milling. He noted the comparative milling effects of soap, acid, and water by this "positive stretch" method with the observation that the maximum shrinkages occurred in the order,—acid, soap and water. In checking the hand of the resultant fabrics, it was found that the one fulled in soap was boardy, the acid milled sample was loftier but harsh, and the fabric milled in water possessed the most agreeable finish, open in texture with a nice nap. The importance of these experiments lay in the fact that appreciable felting was effected in the iso-electric range of wool purely by mechanical means.

The writer has observed the occurrence of marked felting of a fabric in water, when a stretch and compression type of mill is used, such as that exemplified in the hammer type of mill. In our experiments, a blend of thirty per cent of wool was used in admixtures with seventy per cent of rayon and cotton. The material was fulled in a hammer or kicker type of mill in two different solutions—(1) soft water possessing a pH of 8.0 and (2) soda ash solution having a pH of 10.4. The material in each case was given three minute runs with the hammers, following which it was subjected to a stretching operation after these intervals. Although the alkaline soda ash solution produced greater shrinkage, it was evident that appreciable felting had occurred in the material when fulled in water.

King has described the development of a fulling mill, which has been based on the enhancement of felting by both a stretch and compression of the goods. This is carried out by means of a pair of rollers at the spout of the fulling mill, driven in an opposite direction to the movement of the cloth. The goods are pulled against this resistance, with the result that on certain classes of union goods great reduction in fulling time has been realized.

Other factors which have been brought to the fore as influences affecting the felting properties of wool are fiber length (staple) and fineness. It has been our own general experience that the finer wools of short staple usually felt best. This assertion may be favored by the assumption that (1) coarse fibers do not deform or stretch as readily as the finer ones, and, therefore, will tend less to carry other fibers with them, and (2) that coarse fibers possess less scales per unit of weight.

Speakman and Sun[13] studied the influence of fiber length on the milling properties of merino wool, and they came to the conclusion that when yarns of the same strength and count were compared, no simple relationship between fiber length and milling properties could be deduced from the merino wool. In the majority of the cases, short wools were superior, but there were exceptions to the rule. They believed that no general solution for this problem was possible due to the difficulty of obtaining a wide range of wools, identical in all respects, excepting as regards fiber length, and each wool containing fibers of reasonably uniform length.

No discussion of the felting properties of wool would be complete without some mention of its long chain protein micelle structure, and the changes that take place in this structure under varying conditions of moisture, heat, acidity and alkalinity. As this subject, in itself, would consume an entire paper, we will but confine ourselves to a few observations which have been made in England.

Astbury and Woods[14] in discussing Svedberg's work on the molecular weights of proteins drew an analogy between his theories and that which occurred in the peptide linkages in wool when the wool was stretched in the presence of moisture. They concluded that the fibers although at constant length showed a decay of tension which was permanent in spite of the fact that the stretched fiber retained its power of recovery, at least to its original length in water. The rate of this decay of tension varies with the type of wool, and with the nature of the wetting agent, while there occurs an increase in the rate with a rise of temperature. It is extremely rapid in steam, a short treatment with which so loosens the internal structure of the fiber, that it may be caused to contract to two-thrids of its original length.

Astbury and Woods emphasized the fact that the wetting medium played an important part in the permanent destruction of the internal tension. They noted, after the stretched fiber was treated with steam, that the longitudinal swelling of the same fiber in water was considerably increased which suggested that the average length of the peptide chains had been decreased by the sustained tension in the presence of water.

These investigators decided to note the influence of radiations, such as ultra-violet light and X-rays, on the elastic properties of wool. This was carried out by exposing unstretched wool for sixty hours to the beams of an X-ray tube. After this treatment, it was observed that the fibers showed many of the properties characteristic of wool which had been exposed in the stretched state to the action of steam. This appeared to be a clear case of the disruptive action of high energy quanta on the length and cohesion of the peptide chains, which action was closely related to the influence of various radiations on biological activity.

In a study of the pH stability region of insoluble proteins, Speakman and Hirst[7] compared the effects of organic and inorganic acids on wool. They concluded that in formic acid, the individual long chain protein molecules of the micelles were greatly freed from their mutual attraction. Since the action of both organic and inorganic acids was to reduce the resistance of fibers to extension, it was presumed that their function was to free the molecules in this way. The swelling action of wool fibers in formic acid was found to be of a different order of magnitude from that of sulfuric acid solutions. This might be attributed to the ability of the formic acid to carry the simplification of the structure to the stage of individual chain formation, while with other acids, simplification must cease at one of the intermediate stages. Thusly, although the action of acids was of the same general type, gross differences existed in the extent of the reaction.

If this hypothesis is true, it is clear that the adsorption of acid by wool is accomplished by the creation of new surfaces available for adsorption,—the character and extent of these surfaces being determined by the nature of the acid adsorbed.

Yewdall[15] evaluated the fulling action of sulfuric, hydrochloric and acetic acids against that of soap. His results showed that faster fulling took place with sulfuric and hydrochloric acids, while soap and acetic acid were on a par. Better tensile strengths resulted with the former two acids as well. The writer does not agree with the statement of Yewdall that acetic acid was as good if not better than soap as a rapid fulling agent, because we have noted mill results, as well as laboratory tests which dis-

tinctly showed soap to be the faster fulling agent. These tests were carried out on a variety of wools as well as on material made from shoddy blends.

Yewdall made four general assertions in reference to acid fulling, however, which have proven themselves in practice, especially in the case of woolens fulled in sulfuric acid:

(1) Acid is much more rapid in action, and is capable of milling the fabric to a greater extent.
(2) It produces a fabric of much greater tensile strength.
(3) It imparts a greater degree of extensibility or stretch to the fabric.
(4) It conserves the wool fibers to a greater extent, so that there is less wastage by flocking, and the milled fabric is therefore heavier.

The last assertion is only questionable as regards woolens made from low grade shoddy raw materials.

Acid exhibits the action of hardening wool fibers to some extent, with the result that fabrics processed in this manner possess harsher handles. This effect is especially true in cloths made from fine wools, but is not as noticeable where coarser and stronger-fibered wools are concerned.

In discussing the theory of felting, we should include some explanation of that which occurs when carroted fur fibers are subjected to shrinkage operations. As many well know, the carroting operation consists mainly of treating fur fibers with a mixture of mercuric nitrate and nitric acid. Recent patents have been issued in this country wherein less poisonous compounds have been substituted for the mercury compounds. Following this operation, the very slippery fur fibers, which ordinarily will not felt, possess the tendency to shrink in the presence of acid in the fulling mills.

Hall[16] has reviewed the work of Berg[17] who attempted to find an explanation for the felting action of fibers which did not possess epithelial scales on their surface.

Berg's experiments consisted of taking tufts of fibers with and without previous carroting, and sealing these within glass capillary tubes filled with water. The tubes were immersed in boiling water in order to heat them. A microscopical examination was then made of both sets of fibers before and after heating.

Berg observed that the heating of the untreated fibers did not produce any curling, while but a few minutes of heating were sufficient to make the carroted fibers curl and intertwine with each other. It was therefore a reasonable assumption that the new felting properties of carroted fur fibers were closely associated with their increasing tendency to curl and crimp, as well as deform easily. These new properties were then analogous to those characteristics which made the felting of wool possible.

In the foregoing, we have attempted to present a review of the more recent explanations of the felting phenomenon of wool and fur fibers. We feel that continued research of the chemical structure of wool will result in the practical production of simple processes which will enhance the shrinkage of wool on one hand, and other processes which will render wool shrinkproof.

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Weighing Dyestuffs

Grains or Grams–As You Please

NOEL D. WHITE

INSPIRED by a friendly argument which came up recently while talking shop, as dyers are wont to do when meeting for a game of golf, a fishing party or a social gathering, I decided to do a little sleuthing and try to find out to what extent the metric system of weighing dyestuffs is really used, and how many write a formula in grams instead of grains.

The argument was brought about by a dyer who had criticized my way of writing a formula for 100 lbs. of hosiery, giving the weights of the several dyes in it in grams. His contention was that, since the weight of the goods was in pounds, the weight in the dyeing formula should have been expressed in ounces and grains. He also insisted that no dyer uses a grams scale, but makes calculation and weighs his dyes in grains and ounces, that being the most expedient way and the only way in use in the United States. The attitude of the other dyers present being to remain on the fence, so to speak, I thought evi-

dently each had his own opinion on the subject, and the issue remained open.

Having made up my mind to find out all I could about it, and especially how wrong I was in my way of calculating a dyehouse formula, I naturally began by analyzing my own method and how I came to adopt a system which, now that it had been brought to my attention, seemed to be so unorthodox.

Reviewing some of my formulas, which worked quite well, I found that the weights were a shameful mixture of avoirdupois and metric system in which I had used pounds, ounces and grams, instead of grains, and where, to be consistent, I should have used Kilograms, hectograms, grams and milligrams. Now, what made me do that? In my case I reasoned that the explanation was one of expediency and goes back to the time I took a job to dye spun silk for a New England mill. The manager who had hired me in New York had told me that I should not go up to that mill and start in by finding faults with the equipment that was up there, but should make the best of what there was and keep expenses down. This I tried to do until I made myself solid in that organization.

The dyer this concern had before I went there was what is called a spoon dyer, kept no formulas of any kind and only weighed dyes which he kept in solution in jugs, pails and tubs, to be taken with a dipper as needed. His scales were not very sensitive and when weighing less than four ounces results were quite doubtful. Since my first experience in dyeing had been in the same school I had no trouble in starting at the job the same way, and did quite well. However I soon found out that the nature of the work demanded that dyeing should be done by the percentage method; repeat orders for the same shades were coming in with regularity; more precision in matching was exacted and my filing cabinet was being filled up with formulas, so I demanded a more sensitive balance to weigh my dyes and a set of metric system weights. When I got it I found myself with a set of weights from two ounces to five pounds and another set from five centigrams to 200 grams. When I needed dyestuffs by the pounds or ounces I weighed them on one scale and for small quantities I used the balance with grams and wrote my formulas accordingly, setting down pounds, ounces and grams and thought nothing of it. This went on for about ten years, until I left that job to take one in an hosiery dyehouse where I found practically the same condition in the stock room—a pair of scales for pounds and ounces, and a torsion balance with a beam divided in cgs, dgs, and grams, and weights all of the metric system genus!

It never occurred to me that there was anything wrong in that set up, so I continued in the old rut for years, writing formulas in ounces and grams, until this argument came up, which sent me on the war path. (War being the fashionable thing just now, indulged in all over the world; economic wars, political wars, etc., and being too old to join an any of them I thought I would enjoy a little war of my own, without any killing, but just to keep an argument alive, and after being properly launched, and have told all I found out, I hope some other dyer will keep it up with me or against me, I don't care which.) The issue is a three cornered one: (1) Do you use the metric system of weighing? (2) Do you use the domestic system of grains and ounces? (3) Don't give a darn and use any weights found on the premises?

To find out if my critic was right I began by making the round of the dyehouses in the vicinity. The first one I visited was a well known plant, one of the largest in the South, where I knew the superintendent well. I asked him if he used the metric system in weighing his dyestuffs and he said: "We use pounds, ounces and grams." "Isn't that a promiscuous way of handling weights?" I asked him, rejoicing that I was not alone in using weights promiscuously, "And why don't you use one kind of weights exclusively?" He showed surprise, and said he never had given it a thought, and that was the way he had found things here. . . . Here was a man also a victim of circumstances who unconsciously was doing his work the same way I was doing it. He had adapted himself to what he had found on the premises. This did not prove anything.

I hiked myself to another dyehouse and told the dyer about the argument I had with my critic. I asked his opinion in the matter. His answer was a real surprise. He said he used the metric system altogether. . . . Now here is one who plays the game strictly according to rules. What would my critic say about this? I hope he reads it. But "one swallow does not make it Spring" as the French would say, so I went to see another dyer I knew.

This man grinned at my question and sheepishly said that he figured in percentages and weighed in grains and pennyweights! This is getting interesting, I thought. "How come," I asked him, "that having studied in a school of chemistry you are using the goldsmiths and jewelers weights?" "I don't know," he said, "except that I found them here and thought nothing of it. What difference does it make?" "No difference at all, as far as I can see," I said, "provided your work is satisfactory." Then I told him about the time I got a job to start a dyehouse for a ribbon mill in Pennsylvania. When I asked for scales to weigh the dyestuffs the owner said he knew where he could get one. When he brought it, it was a butcher spring scale, one of those enameled affairs to be hung on a hook, the stuff to be weighed laid on a plate fastened to a hoop, and the weight is indicated by the point of a spear which turns around the face of a dial. It was quite the thing for a butcher, where he could lay his hand under the beefsteak or the sausage, and watch the spear turning around the dial until he made up his mind what weight he wanted to charge his customer. For weighing dyestuffs I didn't believe it was the proper thing, but I told the boss it would do . . . We both had a laugh, then I went out to look up another victim.

This time my quest also proved disappointing. The

owner of the mill was a friend of mine, but he could not answer my question himself, so he took me to the dyehouse. Here the dyer told me he used grains because his scales were for grains only. That was what he thought. I asked to be shown his scales. It was a torsion balance with a double width beam; the upper part of the beam was divided in grains, but the lower part had the grams decimal traced on it, from one centigram to five grams and this dyer didn't know what they meant until I told him. . . . I marked this on my critic's score.

So far my investigation had proved unsatisfactory. I was getting nowhere and was tempted to believe the question was mostly a matter of geography. I decided to make some inquiries my mail. Accordingly I selected some names and addresses of instructors I knew, who were teaching in textile schools in different parts of the country, asking them if it were true that the most expedient way of calculating and writing dyeing formulas was in grains and not in grams. They all answered practically the same way, saying they taught and made laboratory tests using the metric system, that being the easiest way to find percentages and advised using the grains scales because that is the most logical way to weigh dyes for goods weighed in pound lots. Which conclusion proved my critic's point of view was partly right after all, and made me feel old fashioned and out of date. However I couldn't believe it was more expedient to figure percentage weights in terms of grains and ounces.

I made some more inquiries, this time among the chemists of several dyestuffs concerns. I saved a letter from one of them which was typical of all the answers I received. He said that they figured percentages in grams, then convert into grains by referring to a dyer's percentage scale. . . . And so what does that mean? It means that the correct weight of any dye used in a formula is first determined in per cent, which means by the metric system of grams. Then why go to the trouble of consulting a dyer's percentage scale to convert it into grains when it can be weighed just as correctly in grams, centigrams or milligrams? It does seem a waste of time and knocks the expediency part, my critic advanced, into a cocked hat; also my geographic theory.

Now I leave it to the reader to decide if I am right or wrong, and if you are a dyer how do you weigh your dyestuffs? I knew a dyer in France who used small change, French currency, for weights because he or his assistant were always losing the regular weights. One, two, five and ten centimes (equal to 1/5, 2/5, 1 and 2 cents of our money) weigh one gram, two grams, five grams and ten grams respectively. In Italy money can also be used for small weights and can be relied upon to be accurate. If you ever run out of weights U. S. currency can also be used; however their weight is not as adaptable as the French. A dime weighs 1½ grams; one copper cent, 2 grams; a nickel, 3 grams; a silver quarter weighs four grams, and this is as far as I can go it being the largest piece of money in my possession.

TECHNICAL NOTES FROM FOREIGN SOURCES

Alteration of Textile Fibers and Dyestuffs Under the Influence of Short-Wave Irradiation

Hans Joachim-Henk—Mell. Textil-Ber. 18, 521 (1937). —It has long been known that cellulose weaves, after persistent exposure to strong sunlight, will have become tendered, and will suffer considerably when washed, since the oxycellulose formed in the fiber is easily soluble even in weak alkali solutions. The ultra-violet rays, the most active in this way, are frequently said to exert a catalytic influence in this particular; but such a statement is not true, since we may speak of a catalyst properly only when a reaction is accelerated by the catalyst and substrate entering into a loose, labile union, from which the catalyst is set free again after reaction has taken place with the substrate and the other member of the reaction. The action of light-rays in such cases must be explained otherwise; according to our present method of phraseology, when irradiated, the molecules take up energy in the form of quanta, and so gain a higher total of energy, which expresses itself in the acceleration of the reaction. In contrast to an actual catalyst, each quantum can bring about only a limited degree of reaction, corresponding to the value of the quantum; while a true catalyst should be able to bring about or accelerate a given reaction to an unlimited degree, if it is not more or less destroyed by some side-reaction or poisoned by some product of reaction. The case is otherwise only if, through photolysis, new catalysts are produced, which then can prolong the scope of the reaction indefinitely, and so upset, so to speak, the law of equivalence.

In the present case, it is of course the ultra-violet rays which are the most active, their effect being expressed in a breaking down of the cellulose molecule as a result of the taking up of oxygen from the air, as shown by the fact that cellulose, exposed to the air in a vacuum, does not display the effect. In normal cases, cellulose which has been strongly irradiated shows the reaction typical for oxycellulose by the blue color produced when moistened with ferrous sulfate solution, washed, and then treated with ferricyanide solution. Wool also displays a decided alteration when subjected to irradiation; even its superficial aspect alters. The fiber becomes hard and brittle, appears a light brown, and acts, in the dyebath, quite otherwise than does the sound fiber; it dyes darker with basic dyestuffs and the unsymmetrical indigoids, lighter with the acid dyestuffs and the symmetrical indigoids. A difference is also to be noted between damaged and undamaged wool in their behavior toward higher temperatures—steaming, and toward some reagents; thus, the damaged wool is more easily soluble in alkaline solutions. The characteristic

(Continued on page 332)

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American Association of Textile Chemists and Colorists

JUNE 13, 1938

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CALENDAR OF COMING EVENTS

Outing, Northern New England Section, Andover Country Club, Andover, Mass., June 17, 1938.

Outing, Mid-West Section, South Shore Inn, Lake Wawasee, Syracuse, Ind., June 18, 1938.

Outing, Piedmont Section, Ocean Forest Hotel, Myrtle Beach, S. C., June 24 and 25, 1938.

Outing, South Central Section, Lookout Mountain Hotel, August 5 and 6, 1938.

Annual Meeting and Convention, Atlanta Biltmore Hotel, Atlanta, Ga., December 2 and 3, 1938

Fastness Requirements

of Printed Cottons*

E. M. EDGERTON**

THERE is at the present time probably no phase of our industry in greater need of standardization than in the matter of color fastness on printed cotton fabrics and in the interpretation and guarantee of this factor to the consumer. There are so many different phrases used in guaranteeing or designating color fastness, and so many interpretations of the degree of fastness required to fulfill these guarantees, that present conditions resemble a contest in which each participant makes up his own rules as he goes along, and to best suit his own convenience. Because of the uncertainty regarding the authenticity of these various so-called guarantees, it has become necessary, as protection against excessive complaints, for large department stores, mail order houses, and chain stores, to set up their own laboratories for testing merchandise submitted to them, before offering it for sale. The larger dress manufacturers and jobbers have also become alarmed and from time to time are sending samples of their merchandise to various testing laboratories for examination.

All of these factors should tend toward some standardizing of the degree of fastness necessary to eliminate complaints and returns, except that, unfortunately, there are almost as many different methods of testing in use, as there are testing laboratories, and to further complicate the situation, some of the mail order and chain store laboratories have invented new tests of their own.

Without going into detail as to the comparative severity of the various tests, the A.A.T.C.C. Test No. 2 with 5/10 per cent soap and 2/10 per cent soda at 160° F. for 30 minutes or an adaptation thereof is in most general use, although some independent tests are as severe as to include treatment with the same soap and alkali content for 15 minutes at the boil or with 2 per cent soap for 30 minutes at the boil.

In an attempt to clear up the uncertainty about wash fastness and to be able to interpret the results of all of these various tests in terms of actual performance, we selected from our stock goods, eighteen different pieces of Percales which represented the complete color range, and after dividing each piece into one yard cuts, we mailed a complete set to thirty different commercial laundries scattered over the entire country, with the request that they subject each piece to thirty consecutive launderings, taking out and numbering a small sample after each laundering. With the return of these samples the laundries were requested to furnish data as to the hardness and degree of pre-treatment of the water used in washing, the number of washes and rinses employed, and the time and temperature of each wash, together with the type of soap and soda used, and further data on the use of clearing agents for whitening purposes. We also submitted cuts from the same original pieces of material to be tested at various testing laboratories under their methods, and tested them ourselves under the A.A.T.C.C. Test No. 2, and that test repeated five times; the A.A.T.C.C. No. 3 Test, and to ten, twenty and forty hours' Fade-Ometer exposure. We further had complete sets washed in homewashing machines thirty times under normal home conditions. That is, the samples were put in with regular soiled clothes and were dried, and ironed after each washing.

After collecting and comparing all data, we reached the following conclusions:

1. Except in natural soil areas where laundering was necessarily more severe, and carried out at higher temperatures, with higher percentages of alkali, or where the water used was exceptionally hard, one commercial laundering was comparatively the least severe of all tests. In fact, a number of laundries returned samples washed thirty times without changing the appearance of colors more than would be expected from the amount of mechanical wear and abuse to which the material had been subjected.

2. Home laundering resulted in more fading than any commercial laundering, or any standard tests to which the material was subjected. Five home launderings were approximately equivalent to thirty commercial launderings, even those laundries in the worse soil condition areas, such as Pittsburgh. As all of the home laundering tests were conducted during July and August, and the material was dried out of doors in the sun, this excessive fading was determined to have resulted from exposure to sunlight while wet. This was afterward confirmed by wet Fade-Ometer tests of the same material and also by repeating the experiment and drying the material indoors. Since a number of the colors used in printing these samples were of the fastest type available to produce the required shades, it is evident that there is no defense against the fading of certain colors when home laundered goods are dried in direct sunlight, and also that some Fade-Ometer tests, probably on wet samples, should be included in any wash fastness test.

*Presented at meeting, Piedmont Section, February 19, 1938.
**Director of the Style Bureau and Color Research, Pacific Mills.

3. One test by the A.A.T.C.C. method No. 2 was not sufficiently severe to identify all of the colors which would not withstand thirty commercial launderings, but any shade which did withstand five repetitions of the A.A.T.C.C. No. 2 did not fade materially more in thirty commercial launderings.

4. The interpretations and classifications of the degree of fastness such as excellent, good, and fair by various testing laboratories using different methods, were conflicting. It being especially true that certain shades of light green and light blue, which changed color slightly in the first washing, due to the removal of the finish, but which did not change thereafter, were classified as only good or fair, whereas the same samples subjected to repeated commercial launderings were very little further changed, while other colors which were classed as excellent, faded considerably after repeated commercial launderings.

There seems to be little doubt but that the consumer is becoming more concerned about the quality of the goods which he purchases, and that the retailer and the dress manufacturer are hastening to recognize this factor and are attempting to protect themselves, as is shown by the proposed "Garment Warranty" of the National Association of House Dress Manufacturers, and the "Color Tested" label now in the process of adoption by the National Retail Dry Goods Association. Both of these labels are steps in the right direction, in that they set up some specific test which submitted materials must pass satisfactorily before being offered for sale; the new "Color Tested" label being probably the most satisfactory from the standpoint of being sufficiently severe to exclude the more fugitive of the so-called "Fast to Washing" colors, by reason of the inclusion of some fastness to Fade-Ometer fading in the test. However, this fact must be borne in mind—that the addition of two more tests to an already overcrowded field will not be the solution to the problem unless some general standardization and classification of the term "Fast to Washing" is brought about.

Except in the higher priced brackets of goods we are faced with an economic condition in the relationship between cost and selling price which makes it impossible for any finisher to deliver merchandise printed with the fastest available type of colors at the present prices. Another factor which further tends to confuse the situation is the practice of what is technically "misbranding." That is, the warranty issued by some converters and other sellers of finished goods in marking their sample cards and sample books with such terms as "Guaranteed Vat Colors" and "Guaranteed Fast to Washing," and other similar terms. Identification and analysis of the type of colors used on these sample cards in innumerable cases has shown that the colors used were not all vat colors, and they could not be all guaranteed fast to washing. The use of a warranty which is in excess of the real characteristics of the colors used in printing these fabrics is in itself a dangerous practice, because it tends to encourage the consumer toward the abuse of the material which he purchases. Furthermore, it is the one stumbling block at present which precludes the possibility of merchandising lines of patterns printed with absolutely the fastest available type of dyestuffs, to be sold at prices proportionate to the increased cost, because no warranty could be put on this line which would indicate any greater degree of fastness than is now used on some fabrics which are printed with ordinary fast to washing colors at competitive prices.

Inasmuch as any line printed with the best available type of colors would have to carry an increasing selling price of 2 to 3 cents per yard above competitive prices, there is very little doubt but that such a line after being shown around the market, and sampled by some of the higher price bracket dress manufacturers, or retailers, would be eventually closed out at or below the competitive market price with consequent loss to the producer. There is, however, a place in the market for highly styled lines of goods printed with the best available colors, and for which the higher priced dress manufacturers and retailers would be able to pay a price commensurate with the increased cost of the article produced, but unfortunately, he cannot today with but a few exceptions, purchase such material under present warranties, and be guaranteed that he is receiving the fatest type of colors that can be produced. Inasmuch as 85 per cent of the total yardage processed in the lower end cotton goods market today is strictly a price proposition, the field for higher priced lines of superior fastness is limited although definite.

Considering all these factors, together with the implication that there is a consumer demand for some definite degree of fastness, as is evidenced by moves toward the adoption of warranty labels, and the use of the various testing laboratories, and since all of these various concerns which are purchasing printed materials are setting up their own classifications, it becomes increasingly apparent that unless some definite higher standardizations of wash fastness are adopted in the very near future, the finishers may reach the point where they will find themselves restricted to printing to meet particular fastness specifications for individual customers, inasmuch as there is no guarantee as to the stringency of requirements which the individual consuming outlet may impose upon material which it purchases. It seems at this point, that since a large percentage of present day merchandising on printed cotton fabrics is carried out on a price proposition, and since the present day standard of fastness is somewhat acceptable on this basis, as exemplified by the various tests which have been adopted, that the ordinary use of so-called "fast to washing colors" is generally satisfactory for present purposes, and there is also a percentage of the material processed which could command a higher price if a satisfactory guarantee as to superior fastness could be made; that there is a very definite need of two standards of fastness, which for the sake of convenience

we might call "Fast to Washing Colors," that is, colors which would pass a moderately severe test satisfactorily, and "Guaranteed Fast Colors" which should be the best available colors and subjected to the most severe tests. It also appears that to prevent further complications arising from the great number and variety of the tests which are in use or proposed for this class of colors, that the standardization of these two classes of color fastness should be brought about by the people who are actually producing the goods, namely, the finishers. These tests should be sufficiently severe to be able to pass any of the required reasonable tests used by testing laboratories and independent department store, mail order, or chain store laboratories, and should carry some Fade-Ometer specifications to guarantee against the effects of home laundering. The practice of misbranding by converters or other sellers of finished goods can be prevented by the finishers, if they refuse to back up any guarantee beyond the adopted test for fast to washing colors. The requirements for the guaranteed fast colors should be so severe as to preclude the use of any except the fastest available type of colors, so that the finisher could be assured of an increased financial return in proportion to his extra expense and so that the manufacturer, jobber or retailer who purchases this material at extra cost to himself could be assured of full return for his money.

In view of the fact that the foundations of the tests most generally accepted were developed by the A.A.T.C.C., and that a membership in this organization is highly representative of finishing plants, and allied industries, I would strongly recommend that your committee on wash fastness consider the development of a suitable standard wash test for "Guaranteed Fast Colors," and reconsider its present A.A.T.C.C. Test No. 2 from the standpoint of increasing its severity by lengthening the time of washing (and including some Fade-Ometer requirements) so that this test could be accepted as a standard for "Fast to Washing Colors." Such tests would be sufficiently comprehensive to replace the present great variety of independent wash tests by reason of their being severe enough to cover the requirements of any of the reasonable independent tests and to insure a better degree of protection against home laundering.

DISCUSSION

Chairman: Mr. Edgerton has discussed a problem which many of us meet frequently. When questions of color fastness come up from time to time we say it meets our color fastness test, and when we get a criticism of the fastness of a certain garment we may say "That met the A.A.T.C.C. No. 2 test," and the customer says "But that is not the test that I am making." So it may be time for our Research Committee to review again the various tests for fastness to light and washing, and also consider developing a higher class of tests on which it is shown a considerable amount of work is being done by a number of business houses and laboratories. I do not think we, the A.A.T.C.C., should let this test get out of our hands. It might be in order to present the matter to Dr. Olney as Chairman of the Research Committee.

Mr. Williams: I agree with Mr. Edgerton that too many colors today are sold as guaranteed wash fast colors. There are too many colors that stand the test and get out but won't stand home laundering. There should be a way to limit the colors that are sold on the guaranteed lines.

Chairman: Do you think that this is a matter that correctly belongs to the A.A.T.C.C.?

Mr. Edgerton: Yes. We have customers who in their tests boil for one-half hour in 2 per cent soap, and every color we submit to them must stand that test before they will enter it in their line.

Mr. Feindel: I take exception to that No. 2 test. There should be some alteration there. I have had experience with all manner of colors where some of them will stand the wash fastness but they are not fast to light. I think some test should be made so as to include light.

Chairman: It is your idea that all fast to washing colors should stand a certain amount of light? As it is, the average household laundry does not distinguish between fastness to light and washing when a garment fades.

Mr. Edgerton: When that was brought up we studied home laundering. We thought commercial laundering was the most severe test a fabric would get, but when our tests came back after thirty launderings, and we got the returns from the home laundries, we were absolutely astonished to find that in some cases several home washings were more severe than 30 commercial launderings. We had no idea as to the destruction of color by home laundering, furthermore, conditions vary all over the country, depending on the part of the country in which the goods are sold. We have to supply goods which will be subjected to both home and commercial laundering. The material changes hands many times before it comes to the consumer, and we cannot guarantee one garment in one state and another one in another state. We are finding more and more individual tests being applied, some are the A.A.T.C.C. test No. 2 and some are adaptations of that. We also find more new department stores establishing laboratories and setting up new tests and attaching their own labels, because it is increasingly evident that the A.A.T.C.C. No. 2 is not satisfactory to guarantee a retail store or dress manufacturer against the return of garments because they are not wash-fast, and some standard must be found to guarantee satisfactory wash fastness in better quality garments. Two standards of fastness will have to be adopted, misbranding must be discontinued, and that can be done, we think. It seems that the A.A.A.T.C.C. has made so many advancements in wash test fastness, that we respectfully request they continue with the test in the light of the above facts, and also be the instigators of a standard test for a classification of colored fabrics higher than "Fast to washing."

Chairman: Mr. Edgerton, I was quite interested in what

you said about how a certain color will come down somewhat in one washing but be unchanged thereafter, and another will show little fading by the first wash, but after five will be more faded than the first color is after five washings. That is perhaps a better color than the one that keeps coming down.

Mr. Edgerton: I would consider the first the better color.

Mr. Williams: In Cincinnati we have been up against two or three instances in classifying a fast color, not only for washing and light, but making the A.A.T.C.C. test one time and then a Fade-Ometer, and also an acid and perspiration test, and you would be surprised how few vat colors will stand up under that repeated test, but that is what a garment gets in a washing done at home,—washing and boiling, then hung up in the wind and sunlight and a rather severe perspiration treatment in between the washings and light, and that also has a decided effect upon the fastness of colors.

Chairman: We feel that our Association has done a great deal of pioneer work in trying to get fastness established, but we may have stood still for the last five years, and I think that there is still a big field for our Research Committee in fastness to washing to explore.

Mr. Gaede: Would it be a good idea to send a copy of the paper to Dr. Olney, so that the whole subject may be considered by the Wash Fastness Committee?

Chairman: It would be in order to present this.

Mr. Gaede: I would be glad to put that into a motion, if it will help to bring it to the attention of the Committee.

. . . Motion made, seconded and passed . . .

Chairman: We would like to get as much discussion as we can from this Section upon this subject. Are there any other thoughts that might be offered? How about you, Mr. Eddy? Do you run into fastness trouble, or do you use only guaranteed fast colors?

Mr. Eddy: All the time.

Mr. Newman: There is one thing that I ought to say, and maybe I did not understand you quite correctly. Is it your impression that the finishers could control this misbranding that is taking place at the present time?

Mr. Edgerton: That part of the misbranding that could be controlled by the finishers would be this: At the present time most of this misbranding is done by the people who sell primarily to retailers. We analyzed some of these color cards labeled "Guaranteed fast colors" and found a number of colors which were not absolutely fast. Attention is not brought to this so much, because of the fact that the percentage of the returns is so small, being confined to returns of individual pieces of material; but anyone who sells to cutters who manufacture dresses knows that you not only have to pay for the cloth, but the work that has gone into the garment. During the last year we have been instrumental in bringing about some changes in the labeling of sample cards by pointing out that the selling houses are laying themselves open to severe claims with this misbranding. The finishers, however, cannot do anything unless they have some standardized tests which they can adopt and which will be satisfactory to pass the tests of most of the testing laboratories. If that test were to be developed (and it cannot be developed by the finishers), and in view of the work that has to be done, it seems that it should be done by the A.A.T.C.C. Then the finisher could guarantee his goods to pass that test, and any further guarantee that the converter or seller puts on his merchandise is done at his own risk. That is one way to do that. A person who would mark fabrics "Guaranteed Fast" and which would not pass this test would be open to terrific claims for misbranding, but at the present time everybody uses his own brandings and his own marks to such a state that it will be almost impossible to bring out a fast line any more and guarantee it.

Mr. Newman: You are naturally interested in the merchandising, but the question I had in mind was, do you find most of the misbranding in the hands of the finishers or converters?

Mr. Edgerton: The misbranding is by the sellers of the goods; not by the finishers, because it is the people that actually offer their merchandise for sale to dress manufacturers, and retailers. Of course it has been my impression that the converter has ordered colors for goods that he knew were not fast, and he took the responsibility of selling them for fast colors. I have spoken to several of them but they claim the returns were so small that they were offset by the volume of goods sold. So you see that there is no reason for him to pay more for colors of greater fastness. We know that the largest percentage of the work that is done has to be printed with ordinary fast to washing colors, because of the cost factor, but these colors should not be fugitive colors by any means, and we have found from our tests that the A.A.T.C.C. No. 2 is not severe enough for this class, and furthermore that there is not at the present time any known guaranteed fast test which is rigid enough to force the retailers to use the better class of dyes for this faster line of merchandise which would have to carry a higher price.

Mr. Walker: Mr. Chairman, Mr. Edgerton brought up many interesting facts in his paper. From that Minnesota report it would look as though you had to guarantee your color fast in certain areas or zones. I found in an investigation made about five years ago that certain dyes proved good in California and Florida, terrible in West Virginia and excellent in Maine. Has there been any data collected on that line?

Chairman: Mr. Edgerton has here in his collection data from "How many laundries, Mr. Edgerton?"

Mr. Edgerton: Twenty-two, I believe. We sent out samples to thirty laundries and got answers from twenty-two. We have the data and to anybody who is interested we will be perfectly willing to show them what we have. The time of washing varies from 700 minutes up to 2,300, and the temperature of the wash varies from 70 to 140° F., while the percentage of soap and alkali varies extremely. When we received these tests we got in touch with the American Institute of Laundries in Chicago and showed

them our results. We picked out laundries who were members of that association, and they pointed out soil condition areas, where we might expect more severe laundering, and you can clearly tell from the results under what conditions they were laundered and which would stand up better than others. There is a lot of data there for somebody who wants to go into it, to determine the various effects of soap, alkali, etc.

Mr. Walker: I found in my investigation: atmospheric conditions seemed to have a very decided influence on the fastness of a color. West Virginia atmosphere was acid and we could not find that with California and Florida atmosphere.

Mr. Edgerton: One of the laundries for color retention was located in California and one of the best and also one of the poorest came from Florida.

Mr. Thompson: I would like to say in defense of the tests that have been made and standardized by the A.A.T.C.C., that they do not represent snap judgment; they have been adopted as a result of experiments and tests made over a period of several years in collaboration with technical organizations similar to ours in England and other foreign countries.

It is easy enough to work out more severe tests, but it is quite another matter to find the actual dyestuffs or methods of applying same that will permit the dyer and finisher to meet their higher standards with a reasonably complete line of shades. I think that our various committees on fastness tests have done a most creditable job. Naturally, they have not attained perfection in these tests, and more study can, will, and is being put on such subjects. Suggestions from members and others in various sections of the Association are always most welcome and helpful to the committees studying such matters.

The question of when is a color absolutely fast and when is a man drunk will probably always be a debated subject. The British Society of Dyers and Colorists have five standards to measure washing fastness, as compared with only three in this country, but there are only very small actual differences. The British have two wash tests that employ slightly higher temperatures than our most severe wash test, yet the British medium test is conducted at a temperature slightly lower than our medium or No. 2 wash test. There will probably always be controversies from time to time over such matters that are not as definitely measurable as we would often like them to be.

We are constantly facing the problem of retail distribution of the goods manufactured with color in them. When the manufactured goods pass through so many hands before reaching the ultimate consumer, one cannot be surprised too much to hear of goods not standing up to the service to which they are subjected. It is possible that they were never intended to be sold or used for such purposes. Regardless of whether the jobbers or retail sales clerks are responsible for misdirecting the colored goods into the wrong channels of use, with resulting complaint of color fastness, the manufacturer of the goods and the dyestuff manufacturers are held responsible by the public.

It is the duty of our Association to try to help the textile industry in finding methods of making and applying faster colors, and at lower costs; but as long as cheaper colors of less fastness are available, they will be used, and such goods will always give trouble when sold as fast colors. You seldom find such cheap and fugitive colors in a line of advertised fabrics, and it appears that truthful advertising may be the final answer to this color fastness problem. I mean by this, that goods bearing a certain label or selvage mark, indicating that they have successfully passed the requirements of a reliable and well-known and commonly accepted test, will give the buyer and ultimate consumer something to count on. This also means to me that we as the American Association of Textile Chemists and Colorists, should give more thought to advertising our aims, objects, and accomplishments, and get the American public more conscious of what we are trying to do for them, and get their backing in such matters, i.e., get them to ask for goods that will stand the No. 3 A.A.T.C.C. Wash Test.

Mr. Edgerton: The people in general, I mean people that buy goods, manufacture goods, sell goods,—have adopted the old A.A.T.C.C. No. 2 test and are still using it. Eighty per cent of the new laboratories that are being set up by independent stores are using the A.A.T.C.C. No. 2, or some variation of it. The fact that this test has been developed on a scientific basis is the reason I am saying that this organization should be the organization to set up these new tests. There is one other thing, that is, the question of department store salesmen and their reaction to wash fastness. I have two types in mind. First, the department store that sells high priced merchandise and that does not carry any so-called junk; this class includes some of the expensive houses. That store has a policy that any employee or any sales person in that store who makes guarantees regarding the fastness of the material that is sold, beyond what is labeled on same, is liable to instant expulsion. That is the reliable store making money. They test their own material and put it out under their own label, their test is built around the A.A.T.C.C. No. 2. The other type is the store that sells low end material at a cheap price. He was shocked because we refused to mark his material "Guaranteed Vat Colors" when they were printed with "Fast to Washing Colors." I said: "What is your sales policy about color fastness?" He said, "We sell our goods and our salesmen are told to tell the customers that they are guaranteed absolutely fast." I said, "What do you do about returns?" He replied, "If an article is returned we give them their money back." I said, "Even if the article shows that it is worn out?" He said, "Absolutely," and that store sells this merchandise at 10c to 15c per yard. The better stores are directing their salespeople not to stress too strongly "Guaranteed Fast", for there is always a re-action from abuse of this term.

The Tendering Action of Light on Textile Fibers*

WILLIAM H. CADY**

MY excuse for speaking on this particular subject tonight is that the Research Committee of the A.A.T.C.C. is considering the possibility of investigating the action of light on the cotton fiber, and a committee of which I am chairman is at present engaged in studying the literature in order to determine what has been already accomplished along this line. So when your chairman asked me to speak at this meeting, it was perhaps natural that I selected as my subject the thing which was uppermost in my mind. This paper does not pretend to be a complete treatise on the tendering action of light, but it is offered in the hope that it will awaken some interest on the part of those who may not have heard of these phenomena, and may stimulate a little reading on the part of those who wish to learn more.

At a recent meeting of the Research Committee of the A.A.T.C.C. a discussion regarding the action of ordinary sunlight and ultra-violet light upon both dyed and undyed cotton led to the appointment of a special committee, to investigate this subject. William H. Cady was appointed chairman of such a committee, and the accompanying paper, while not submitted as a report, presents an excellent review of the subject.

Mr. Cady would appreciate receiving from members of the Association, or readers of the DYESTUFF REPORTER, any comments upon his paper, or facts or statement of experiences they may have had in regard to the action of light upon dyed fibers, which they believe may be of interest to his committee.

It is well known that exposure to light has a destructive action on most dyes. It is perhaps not so well known that prolonged exposure to light has a tendering action on most fibers. In the case of the cellulose fibers, this tendering is believed to be the result of a pronounced speeding-up of a normally very slow process of oxidation of cellulose to oxycellulose and carbon dioxide by the action of air and water. This sort of reaction is going on slowly all the time, and is much more rapid in the light than in the dark.

Jones[1] found that bleached cotton when exposed to sunlight for a long period deteriorated somewhat more rapidly than unbleached cotton. The various regenerated cellulose rayons behaved similarly to cotton. Silk was tendered most of all, linen was more rapidly attacked than cotton, while wool was least affected. Cunliffe[6] confirmed Jones' findings on bleached and unbleached cotton.

Landolt[2], in an exposure to sunlight for 14 days, obtained the following values for the tensile strength of fibers so exposed (compared with 100 per cent for the untreated fibers): cotton 89 per cent, viscose 78 per cent, pure silk 56 per cent, weighted silk 34 per cent.

Grimes[3] exposed cotton fabrics of various colors and constructions to the sun for 375 hours, and obtained a loss in strength varying from 8 to 47 per cent in the warp and from 18 to 58 per cent in the filling.

The Sub-Committee on Light Fastness of the A.A.T.C.C[4] made a large number of prolonged exposures to light of dyeings on cotton, wool, and both weighted and unweighted silk a few years ago. It was noticed that the silk dyeings were much more tendered than those of cotton and wool.

The factors which have most influence on the tendering action of light may be listed as follows: 1. The light itself (quality, wavelength, etc.); 2. Humidity, atmospheric gases, etc.; 3. Dyes present; 4. Finishing agents, delusterants, mordants, etc.

1. Light

It is probably the short wave light which does most of the damage. Salley[5] stated that light of wave-length shorter than 4000 Angstrom units is necessary to cause deterioration of the fiber. Barr and Hadfield[7] found that the most harmful part of the spectrum lay between 3900 and 2950 A. units. Bruner and Goehring[15] tested silk, both weighted and unweighted, in light of different wave-lengths, and found that the decrease in strength was due primarily to light rays below 3490 A. units. On the other hand, Jones[1] stated that light of any wave-length can produce tendering if it is absorbed, and that the controlling factor is not the absorption spectrum of the dye on the fiber but some element not yet recognized.

2. Moisture, Etc.

Moisture is an important factor in accelerating the tendering of cotton exposed to the sun in presence of oxygen[6, 8, 12]. Open air exposure tenders cotton and rayon more than exposure under glass[12]. Industrial atmospheres (laden with sulfur dioxide, nitrogen peroxide, etc.) tender more than suburban atmospheres[1, 11, 12]. Pure country or seaside air has the least effect[12]. When cotton is exposed to light in an atmosphere of nitrogen, hydrogen or in vacuo, much less tendering takes place[6], and little tendering in a dry, sealed atmosphere[12].

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**Presented before Northern N. E. Section in Boston, March 4, 1938.

3. Dyes

Perhaps the most interesting of the various phenomena of tendering by light is the catalytic action of some of the vat dyes. Scholefield[10], Landolt[2, 17], Whittaker[11, 12] and others have called attention to this repeatedly during the last ten years. Briefly, if cotton dyed with certain vat dyes, particularly yellows and oranges, is exposed to the sun for a considerable period, say three or four weeks, the tensile strength is materially reduced; while cotton dyed with other vat dyes and similarly exposed shows little or no loss in strength. Landolt gave figures which he obtained on exposing a large number of vat dyeings to the sun for 215 hours. The tensile strength resulting, compared with 100 per cent for undyed cotton, showed the following extremes:

Indanthrene Yellow G....	91 per cent
Helindone Yellow 3GN...	33 per cent
Ciba Brown R.....	95 per cent
Ciba Yellow G.....	39 per cent

Landolt also showed that if certain vat dyeings are saturated with dilute caustic soda and exposed to the sun for only an hour, the tensile strength of the cotton is greatly reduced, while white cotton similarly treated loses no strength. For the most part, the same dyes which cause tendering in the normal exposure (without caustic) also cause tendering in the short exposure with caustic.

Further, if cotton is dyed with a combination of one of these tendering dyes (Helindone Yellow 3GN, for example) and a non-tendering and otherwise very fast dye (Indanthrene Blue GCD, for example) and exposed for 100 hours or so, the blue dye is nearly destroyed. A similar exposure of this blue dyed by itself shows no fading.

The same effect is produced if one of these tendering dyes (Helindone Yellow) is topped with a fast-to-light direct dye (Chlorantine Fast Blue 4GL, for example). On exposure the blue is entirely destroyed in a relatively short time.

I realize that fading action is entirely outside of the scope of this paper, which deals only with tendering phenomena, but it is interesting to note that both Landolt[2] and Godlove[16] have referred to the strong connection between the loss in tensile strength and the acceleration of fading which results from the use of these particular vat dyes, and they have suggested that the fading of a direct blue used as a "topping" dye may be employed as a sort of measuring stick to indicate probable fiber damage.

Landolt[2] has found that of all the important vat dyes, those which tender the fiber on exposure to light constitute 75 per cent of the yellow and orange dyes, 50 per cent of the scarlets and reds, 30 per cent of the violets and none of the blues. On the other hand, it is stated[6, 12] that direct cotton dyes in general exert a certain amount of protective action on cotton fibers when exposed to light.

4. Finishing Agents, Mordants, Delusterants, Etc.

Salley[5] states that the presence of iron or other heavy metals in the fiber accelerates tendering by light. Cotton cloth impregnated with ferric hydroxide and exposed to the sun is said by Barr and Hadfield[8] to deteriorate more rapidly than untreated cloth. Whittaker[11] claimed that the presence of chromium in vat dyed fabrics promoted tendering in light. On the other hand, Cunliffe[6] reported that cotton cloth treated so as to precipitate chromium hydroxide was much more resistant to destruction by light than untreated cotton, while ferric hydroxide gave a slight protection. He stated that mineral khaki produced on a cotton fabric would prolong its life to five or six times that of an untreated fabric. Titanium dioxide, used largely on rayons as a delusterant, tends to accelerate tendering. Wiegand and Schöniger[9] state that when a rayon is treated with titanium dioxide, the latter reacts with atmospheric oxygen to form peroxides, and on exposure to light in presence of moisture these peroxides tender the fiber by formation of oxycellulose. Barium sulfide, lead tungstate and iron tannate are also said to accelerate tendering of cotton, while lead chromate is claimed to give protection[7]. Cunliffe[6] found that cotton mordanted with tannic acid and tartar emetic was less tendered than untreated cotton when exposed to the carbon arc, but the reverse was true when they were exposed to the sun.

The previous observations refer in particular to the cellulose fibers. Next are given a few comments on the animal fibers.

Wool

As stated, this fiber is less affected by exposure to light than any of the other fibers, but Cunliffe[13] states that it does show a progressive loss of strength. Exposed wool becomes acid, slowly at first, and then more rapidly, and shrinks less rapidly when fulled. The loss of breaking strength after 200 hours in the Fade-Ometer is said to be about 25 per cent. If the wool is washed after exposure to light, there is an additional loss of strength. Rakhlina[18] states that wool dyed with chrome dyes is less damaged by exposure to light and weather than wool dyed with acid dyes or undyed wool.

Silk

Harris[14] found that when silk is exposed to light, the amount of tendering depends upon the pH. Maximum stability was obtained with a pH of 10; above 11 and below 3 the stability decreased rapidly. Silk treated with 0.1 normal caustic soda was more stable to light than either untreated silk or silk treated with 0.1 normal sulfuric acid. Practically the same results were obtained in sunlight and in exposure to a carbon arc. Harris found also that tendering of silk takes place only in presence of oxygen, is aggravated by moisture, and is accompanied by an increase in the ammonia nitrogen content of the silk. Bruner and Goehring[15] found that lead weighted silk tendered more rapidly than either pure or tin weighted silk. Jones[1] reported that the same vat dyes which accelerate tendering on cotton also do so on silk.

Conclusion

It is evident that much progress has been made in

studying the effect of dyes, chemicals, etc., in accelerating the action of light on the textile fibers; but there is still room for further investigation into the real causes underlying these phenomena. Also it would appear that there is a field for research along the line of protective treatments for fabrics which are to be subjected to prolonged exposure to light, in order to counteract the tendering action and thereby prolong their useful life.

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[7]J. Soc. Dyers & Col., *41*, 414 (1925).
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[15]Text. Res., *5*, 231 (1935).
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MEETING, NORTHERN NEW ENGLAND SECTION

A MEETING of the Northern New England Section was held at the Andover Country Club, Andover, Massachusetts, on Friday, May 6th, 1938, with about 100 members present. The following program was presented and was thoroughly enjoyed by those present:

"Olive Oil Substitutes for Worsted Lubrication." Mr. Hugh Christison, Chief Chemist of the Arlington Mills.

"Permanent Finishes on Textiles." Mr. K. H. Barnard, Chief Chemist, Pacific Mills Print Works.

"Notes on the Fastening to Water of Union Dyed Fabrics." Mr. Edward S. Chapin of the W. C. Durfee Company.

"Australia and Wool." Mr. Russell H. Harris, Wool Buyer of the American Woolen Co.

Election of officers for the year 1939 was also held at this meeting, with the following members selected:

Chairman: Clarence L. Nutting.
Secretary: John N. Dalton.
Treasurer: John H. Grady.
Sectional Committee: D. Scott Clement, Joseph P. Talbot.
Representative to National Nominating Committee: W. H. Zillessen.
National Councilor: Dexter R. Kneeland.

Respectfully submitted,

JOHN N. DALTON,
Secretary.

MEETINGS, NEW YORK SECTION

February Meeting

THE fourth regular meeting of the New York Section was held on Friday evening, February 25th, 1938, at the Swiss Chalet, Rochelle Park, N. J., at 8:00 P. M. The usual informal dinner was held at 6:30 P. M. preceding the meeting.

Mr. Rudolph Lindenmaier, Technical Advisor in the Chemical Department, Sandoz Chemical Works, presented a paper, "Some Aspects of Water Repellancy."

Also, at this meeting, a motion picture entitled "Beyond the Rainbow" was presented by the Calco Chemical Company. Mr. R. R. Sleeper of the Calco Chemical Company made the following remarks before the motion picture was shown.

* * *

Remarks by
R. R. SLEEPER

IT has occurred to your Program Committee that many of you have not had the opportunity to personally visit a dyestuff manufacturing plant and witness first hand its operation and therefore it would not be a bad idea to bring before you, through the medium of a sound motion picture, the workings and set up of a modern plant of such a nature.

Since the introduction of synthetic or coal tar dyestuffs there has been the feeling in the minds of some people that dyestuffs are actually present in coal tar but you can take my word for it that such is not the case. The only coloring matter present, if you want to consider it as such, is carbon which has more or less of a staining property.

Where does this coal tar come from? It is a distillation product obtained from the destructive distillation of coal. We have two sources. One is the illuminating gas industry and the other is the coke industry. It is a by-product in both cases and is a highly complex mixture of many, many hydrocarbons.

Upon subjecting this black coal tar to a very carefully controlled fractional distillation we are able to obtain numerous definite chemical compounds, those of low boiling point coming off first and finally those of a very high boiling point, the latter being solid at room temperature. A typical example of a low boiling distillate is benzene while a high boiling distillate is naphthalene or the common "moth balls" of the trade.

The first collections or distillates are more or less contaminated with other hydrocarbons and therefore to obtain a more complete separation a redistillation and purification is resorted to in order that the chemist may have at his disposal pure products of definite chemical constitution.

The dyestuff industry finds use for many of these purified distillates, as for example benzene which is converted into nitrobenzene and in turn reduced to aniline. Naphthalene is converted into beta naphthol. By treat-

ment of obtainable intermediates, under carefully controlled conditions, with different chemical compounds, we introduce into their structure different radicals, as for example the sulfonic acid, carboxyl, hydroxyl, ethyl and methyl, etc.

We thus produce another line of definite chemical compounds which in turn go to make up numerous others. After a series of such reactions, under very careful chemical and mechanical control, we arrive at what we are trying to obtain, a dyestuff the chemical nature of which is definite.

There is a limited number of dyestuffs whose chemical structure we are not positive of—Nigrosine and Sulfur dyes being typical examples. However, processes have been developed for their manufacture which enable the dyestuff manufacturer to produce batches of equally satisfactory uniformity as compared with dyestuffs of known chemical structure.

The function of the dyestuff chemist is primarily to produce the dyestuff. Upon completion the crude product is taken in hand by the personnel of the standardization department who proceed to recommend blend formulas for the various batches and finally the mixture is in the form of a finished product of definite properties such as shade, color value, solubility, fineness, color of powder and numerous other physical characteristics comparable with type or standard.

Here again very careful control is necessary in order that the final product will produce results which the colorist expects and is entitled to.

What must the standardization man be watchful of? Naturally shade and color value are of paramount importance. He must standardize the product being tested to a definite color value or strength and shade on the type of material for which it is to be used. He must watch solubility at a definite concentration and temperature in the solvent employed by the consumer. The product must be of a degree of fineness which is determined by mesh test. Contamination is not allowable. Paste products must be so prepared as to eliminate possibility of settling or fermenting and must make numerous other tests depending upon the use to which the dyestuff is to be put before it is considered OK for shipment.

After the finished dyestuff has been made what use is made of it? In the minds of many it is used primarily for the coloring of textile material. There is practically no object or material in this room which has not been artificially colored.

The ceramics in the form of china-ware that you see here are not colored with dyestuffs. Colored glass as we think of colored glass, has not been colored by what we consider dyestuffs. But practically everything else you see has been colored with synthetic or coal tar coloring matters—the wool, the silk, the leather shoes, the hair on some of your heads (not mine), the foodstuffs, the flooring and panelwork, together with such articles of the trade as match heads, oranges, furs, printing and lithographic inks, so prominent on the covers of magazines, paper, foodstuffs, confectionery, and products such as Beetleware and Bakelite, etc.

Stop and consider and you will realize that the dyestuff manufacturer furnishes coloring matters for a great many industries other than the important textile. The paper industry consumes a tremendous amount of dyestuff as does the leather and printing trade.

I might state in regard to fur dyes, for we know them as such, that the coloring of fur, and a considerable amount of fur is artificially colored, is not in my mind a dyeing proposition. It is a staining proposition. When coloring furs it is not permissible to employ a very hot bath, as in the case of cotton, silk and wool, otherwise the skin or leather portion would be seriously affected. Very attractive color effects are produced on furs which would otherwise be unmarketable if not so processed. Furthermore, if natural colored fur was the only type available to the trade the use of fur garments would be curtailed to a great extent because of economic reasons.

We find a variety of uses for the same dyestuff. Many of you gentlemen are familiar with certain types and perhaps feel that such are only used in the way you employ them. For example, Acid Orange which all wool dyers are familiar with is very extensively used for paper, leather, in the color lake industry and for the coloring of dressing for your tan shoes. Rhodamine which the silk dyer and printer is familiar with as producing beautiful shades of pink and rose is also used extensively for the coloring of paper and to a limited extent on wool. Methylene Blue is widely used for the coloring of paper and to quite some extent by the silk and cotton dyer and printer, and also, when purified according to government specification, for medicinal preparations.

The manufacture of dyestuffs is a very complicated operation. It requires very highly skilled technique. Every operation is very carefully controlled not only by the chemist but the physicist and engineer in order that the final product, which as I have stated before, is up to standard and delivered to the trade as such.

I am not going to make any further remarks, I am going to ask the operator to proceed with his part of the program.

* * *

Dr. J. E. Meili, Chairman of the Program Committee, referred to our next meeting, at which time it is expected we will have a well-known speaker of outstanding qualifications in his field.

Mr. George L. Baxter, Chairman of our Section, informed the gathering that he had received a number of comments from the local members that it might be well to have only one speaker at our meetings and to use the balance of the time in open discussion regarding technical problems concerned mainly with textiles. Mr. Louis S. Zisman concurred with Mr. Baxter's remarks and felt

that possibly a forum of this nature would prove of instrumental value to the members of our group. So that such a forum might be held effectively, it was Mr. Baxter's thought that all technical questions should be put in writing and submitted to the officers of the Section in time to have an answer or a speaker discuss the problems at a subsequent meeting.

There was a total attendance of eighty-seven (87).

Respectfully submitted

P. J. KENNEDY, *Secretary.*

March Meeting

THE fifth regular meeting of the New York Section was held on Friday evening, March 25th, 1938, at—

Place: Chemists' Club, New York City.

Time: Dinner—6:30 P.M.; Meeting—8:00 P.M.

Speaker: Mr. E. A. Back, Entomologist on Insects Affecting Men and Animals, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

Subject: "Protection of Wool Materials Against Moth Ravages".

Attendance: Seventy-five (75).

The Treasurer's report by Mr. John J. Sokolinski indicated that meetings held at the Chemists' Club usually end in a deficit. Any deficit or unpaid bills will be carried over until the final meeting of the season before requesting assistance from the parent body.

Dr. Meili, Chairman of the Program Committee, informed the members that we may expect one and possibly two well-known speakers at our next meeting to be held at the Swiss Chalet.

Mr. George Baxter, Chairman, also referred to our next meeting.

Respectfully submitted

P. J. KENNEDY, *Secretary.*

April Meeting

THE sixth regular meeting of the New York Section was held on Friday evening, April 22nd, 1938, at—

Place: Swiss Chalet, Rochelle Park, N. J.

Time: Dinner—6:30 P.M.; Meeting—8:00 P.M.

Speaker: Mr. W. F. Macia of A. M. Tenney Associates.

Subject: "Oils and Sizes used in the Manufacture of Rayon Fabrics and their Influence on Dyeing".

Attendance: Seventy-four (74).

Mr. John J. Sokolinski, Treasurer, submitted his usual report.

Mr. George Baxter, Chairman, appointed Mr. Bert Royce Chairman of the Annual Outing of this Section which is to be held on June 10th at the North Jersey Country Club. This date was selected in order not to conflict with meetings of the other Sections and other organizations having similar interests.

On motion of Mr. Dan Knowland, it was voted that the Secretary write a letter to Mr. Walter Hadley, informing him that this Section is very glad to know of his recovery from his recent illness.

Respectfully submitted,

P. J. KENNEDY, *Secretary.*

May Meeting

THE seventh regular meeting of the New York Section was held on Friday evening, May 20th, 1938, at—

Place: Swiss Chalet, Rochelle Park, N. J.

Time: Dinner—6:30 P.M.; Meeting—8:00 P.M.

Speakers: Mr. Ben Verity of the Carbic Color & Chemical Company.

Subject: "Indigosols and Their Application in Dyeing and Printing".

Dr. Harold Dewitt Smith of A. M. Tenney Associates.

Subject: "The Trend of American Textile Research".

Attendance: Eighty-five (85).

Dr. Joseph F. X. Harold and Dr. Harold Dewitt Smith of the Nominating Committee proposed the following names for office for this Section for the coming year:

Chairman—Louis S. Zisman.

Vice-Chairman—Dr. Ernest Meili.

Treasurer—John J. Sokolinski.

Secretary—P. J. Kennedy.

Councilor—Henry F. Herrmann.

It was voted unanimously that the Secretary cast one ballot electing the above members to office.

Mr. George Baxter, the retiring Chairman, expressed his appreciation for all the assistance received by him from the members, as well as the officers of this Section, during his term of office.

Dr. Meili also expressed his appreciation for the assistance extended to him as Program Chairman.

Mr. Henry Herrmann informed us that Dr. Hans Meyer has been seriously ill and only recently was able to attend business for a short while. He proposed a motion, which was adopted, that the Secretary write Dr. Meyer, extending to him our very best wishes for a complete and speedy recovery. Mr. Herrmann called our attention to the many years of loyal service and assistance given to our Association by Dr. Meyer.

Mr. George Baxter, in the absence of Mr. Bert Royce, Chairman of the Outing, again invited the members and their friends to assist the committee in making our outing on June 10th at the North Jersey Country Club an even greater success than in the past

Respectfully submitted,

P. J. KENNEDY, *Secretary.*

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary or the American Dyestuff Reporter any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE SECRETARY OR THE AMERICAN DYESTUFF REPORTER AT ONCE.

Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-4

Education—University of South Carolina, New York University, Philadelphia Textile School.

Experience—Chemist for 3 years with dyestuff company; 1 year as chemist in dyeing plant on pure and tin weighted silks and rayon; 3 years plant chemist for cotton dyeing, printing and bleaching plant.

Married; age 30; references. Prefers Metropolitan area but will go anywhere.

A-B-1

Education—Graduate chemist and colorist from a leading textile institute. Speaks French fluently. High standing at school. Awarded 1st prize in chemistry. Member of honor society.

Experience—Knowledge of most processes of textile manufacturing and some experience in woolen and worsted piece and stock dyeing and color matching. Knowledge of finishing. Wishes to get into laboratory or dyehouse.

A-B-7

Education—Evening school in textile dyeing and chemistry.

Experience—Dyehouse laboratory for 2 years. Foreman dyer and finisher on hosiery for 9 years. Experience on ribbons also vat dyes on rayon and silk skeins. 2 years assistant to superintendent. Desires position either in demonstrating and sales or dyer. Age 31; married.

A-B-C-4

Education—Educated abroad.

Experience—Twenty years experience in the textile field as bleacher, dyer, finisher and chemist. 16 years in charge of dyestuff laboratory of large dyeing plant, 4 years as chief chemist with large bleachery. Has tested dyestuffs, and chemicals used in the textile field and has manufactured soaps and textile specialties. Has handled all textile fibers; bleaching, printing, dyeing and finishing same. Has done pigment and lacquer printing, waterproofing and fireproofing. Reason for leaving last position was due to business conditions.

Age 41; married.

A-B-C-5

Education—High school textile school graduate (textile school of Barman, Germany).

Experience—8 years skein and ribbon dyer; 2 years chemist-colorist laboratory work in Germany. 10 years boss dyer and superintendent for finishing in leading ribbon mill. German; American citizen; married; 40 years of age and willing to go anywhere.

A-B-C-6

Education—English Municipal School of Technology; Board of Education, So. Kensington Chemistry Certificates; City & Guilds of London Institute in Bleaching and Dyeing.

Experience—In U. S. A. 22 years as chemist and chief chemist with one of the largest textile plants in the country; expert colorist; long experience with permanent and semi-permanent finishes. Specialist on vats, naphthols and indigosols. Age 49; married.

A-B-C-7

Education—B.T.C., Lowell Textile Institute, member of honor society; speaks French fluently.

Experience—3 years as textile research chemist in charge of dye house and advisory to purchasing for large Canadian plant. Experienced in woolen and worsted yarn dyeing, for weaving and knitting; raw stock, top dyeing, piece goods dyeing and finishing. Laboratory practice in planning and checking methods and processes, costing and purchasing. 1 year experience as assistant dyer in top dyeing and print works. 1 year as chief chemist in cotton mill in charge of laboratory and control work of vatcolors, naphthols, sulfur and developed colors.

Married; age 28; references; American citizen; will go anywhere; desires opportunity to prove capacity.

A-B-C-F-1

Education—Textile institute course; extension work at Brown; executive training with Alexander Hamilton Institute; knowledge of German.

Experience—Dyeing executive in all types of textiles, including stock, yarns, and piece-goods. Thorough knowledge of all classes of dyes and dyestuffs, and their successful practical application in the plant. Wide experience in all types and makes of equipment used in dyeing, bleaching, mercerizing and finishing. Laboratory practice in planning and checking methods and processes, costing and purchasing. Good manager personnel for efficiency and satisfactory results economically obtained. Cotton, rayon and silk, some acetate rayon, and mixed fabrics. Age 46; excellent references; in excellent health.

A-B-C-F-2

Education—Lowell Textile Institute, 1911.

Experience—26 years in cotton yarn and piece goods finishing plants; expert on naphthols, vats and other cotton and rayon dyeing; all types of control work and testing; analytical processes; purchasing of dyes and chemicals. Age 46; excellent references; in perfect health; will go anywhere; married.

A-B-F-1

Education—Technical School. Dyeing and Chemistry.

Experience—Mill chemist. Dyer: yarns, tops and rawstock; wool, cotton and rayon. Vigoreaux printing. Bleaching. Would like position as dyer, chemist or demonstrator. Business conditions reason for leaving last position. Excellent references. Age 45.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following: rayon, cotton backs, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-4

Experience—Foreman dyer in charge of ribbon dyeing for 20 years. Experienced on silk, cotton, rayon, acetate yarn. Age 41; will go anywhere.

B-5

Education—High School and Textile School Graduate.

Experience—Twelve years overseer of dyeing on directs, vats, naphthols, sulfur, basic and developed colors. Also experienced bleacher. Age 40; married; references.

B-6

Education—Textile School Graduate.

Experience—Former instructor in chemistry and dyeing. Twelve years' experience as overseer of dyeing of vats, naphthols, developed, indigosols, sulfur and direct colors on piece goods. Age 35; excellent references.

B-C-1

Experience—20 years experience in dyeing and finishing departments; 15 months as general superintendent of well known woolen mill. Capable of handling dyeing alone or in combination as superintendent of dyeing and finishing.

Age 40; references.

B-C-2

Experience—12 years foreman piece dyer on vats (pigment), naphthols, soluble vats, sulfurs, developed, basics and directs. Pads, jigs, boxes and continuous machines. All constructions of cottons and rayons. Full practical knowledge of bleaching, mercerizing, and working knowledge of most finishes and finishing machinery. Could take charge of entire wet processing.

Age 38; married; references.

B-D-1

Education—Received early training in England and attended technical college there.

Experience—Dyeing executive; all types of ladies and men's hosiery and all types of textiles including stock, yarns, piece goods and government uniforms; woolen and worsted suitings; cotton, silk and rayon on yarns, piece goods and mixed fabrics; thorough knowledge of all types of dyes, successful application of same and laboratory work. Fourteen years with one employer; business conditions reason for unemployment.

Age 52; married; English American; sober and reliable. Desires position as dyer or demonstrator and service man for dye company.

AMERICAN
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PROFITABLE RESEARCH

A DOZEN years ago, I found a number of high class retailers who would not consider selling rayon garments. They insisted that the quality of the material was not up to their standards, that it would not satisfy their customers. I continued to call on the buyers of these stores, month after month, gathering news of the trade and was able to get their frank opinions. Within a few years, every store was handling rayon. Some had special rayon sections in each department where rayon goods were sold.

The buyers explained that the quality had been improved to such a degree through research work that the public came to demand rayon. They had to stock it and it was giving satisfaction. So an industry born in the research laboratory and nourished on research has grown to vast dimensions.

Recently, I talked with a manufacturer of special marking machines. He told me that all through the depression he had kept his plant operating, that he had not laid off a single employee and that now he was opening a new branch.

He explained that this had been the case because he was doing more research work than he had ever done before. The standard marking machines he had been selling for years would not have supplied a fraction of the employment he has been giving steadily. As a matter of fact, with nothing but what he had been doing up to the beginning of this depression, his business would be showing a serious loss.

He has been keeping in close touch with concerns doing research work on products which will have to be marked when they are commercially produced. Five men are out calling on these concerns all the time. The total mileage driven by these men in a year comes to around 150,000 miles. The research work needed to solve the marking problem is done by this company in its laboratory equipped for the purpose. Both chemical and mechanical research is done and special machines designed and built.

The significant part of all this is the fact that it has been possible to find enough new products during the depression, which require special marking problems to be solved, to keep this concern busy doing little else than working on those problems and building the special machines. The sort of competition which comes from research is increasing by leaps and bounds.

Just as rayon, about which the public had never heard a quarter of a century ago, which was more or less sneered at fifteen years ago, finally won its place through improvements brought about by research and has grown into an industry that competes with the other textile industries, so research is creating problems which can be solved only by research in every old industry.

Plastics have displaced metals and other materials in many fields. There are prospects that there will be a revolution in home building. We may be certain that many new industries are on the point of being born in the research laboratories.

Just as the manufacturer of marking machines already mentioned has capitalized this fact and used it to keep his company prosperous during a serious depression, it would seem that firms in every industry might well give more serious attention to what is taking place. This particular manufacturer has actually increased the volume of his business by keeping in close touch and showing how his product can fit in with the production of new products and he has done it at a time when his standard machines have not been selling. He has prospered for the simple reason that he has tied his research work in with the research work that is being done all over the country by all kinds of manufacturers.

No one can possibly tell to what a degree silk and rayon will fit in with new products until the most intensive survey is made of all these products and research work done in co-operation with that which is now going on in other industries to solve problems which come up.

It has been obvious, for some time, that the problems of the future have much less to do with production and even with sales than with perfecting new products. We have machinery to produce at greater speeds and greater volumes than ever before. We have instantaneous communication through the radio and the telephone to all parts of the world. Television is developed to such a degree that it is only a matter of time when it will be as common as radio. Authorities differ in regard to when it will make its real bow to the public. Some say within a year, some within ten years. Of one thing, however, we may be certain and that is that within a comparatively short time, the television systems will enable the seller to show his products to the purchaser just as he now talks to him over the radio or the telephone. We have faster transportation than ever before. Fifteen miles an hour was fast traveling

a little more than a hundred years ago. Now planes traveling 200 miles an hour are not considered any too fast.

What we must have to get everyone back to work is more new products to manufacure and to sell. That is absolutely the only way that real prosperity can be attained. It calls for what we might class as mass research work. It means that research workers in each industry must keep in closer and closer touch with workers in other industries toward the end that more really co-operative research work can be done.

It means that, to the degree that silk and rayon research workers discover ways and means of solving problems of research workers in other fields through special uses of silk or rayon, the silk and rayon industries will grow and prosper.

Air planes started out with fabric covered wings. Metallurgists seem to have been more effective in their research work than the textile research workers for, apparently, there is a strong trend toward all metal planes in all sizes and styles. That industry which does the most effective work in solving special problems of other industries where its products can be used in the solutions, is the one which prospers most.

James Watt did the research work, done on the steam engine, pretty much by himself. Alexander Graham Bell did independent work in developing the telephone. However, there were a number of other independent workers. Radio work has been much more complicated. The modern automobile is the result of the combined research of workers in all the industries producing products of raw material that goes into the manufacture of the automobile and of the research work of the builders of machinery used in making the automobile.

The life or death of any industry now depends upon the research work done in it. It can enjoy prosperity only to the degree that it finds ways and means of solving problems in other and new industries through the use of what it can produce. The enormous progress we are making is indicated by a table of the great inventions.

The printing block was invented about 593. There were only five notable inventions beginning with this to the 1700s. During the period from 1733 to 1800 there were 12 notable inventions. From 1800 to 1900 there were 58. During the first score of years of this century there were eight. The older inventions have been greatly improved and brought much nearer to perfection. All this has required research work.

The problem, up to within comparatively recent times was to produce enough. There was the problem of getting things to people when and where they wanted them. There was the problem of letting people know about things. All these have been pretty well solved. The present one is to find new uses in new products for the materials which are being produced.

There is a great deal of talk about research along the line of finding more and more industrial uses for farm products. This is certain to be followed by actual work. Just what these new products will be we do not know. However, we may rest assured that through co-operative research old products can be made to help solve the problem of developing new products from what the farmers produce.

It does not seem to matter much what a manufacturer may be producing. If he has a good research department and if he keeps in close touch with all the research work being done in all other industries, he is bound to find many ways in which he can sell something he can produce to be used in connection with something entirely new some manufacturer in some other industry is producing or about to produce.

Just as the automobile industry has increased the prosperity of all those industries which co-operated with it in research work and made it possible to build the motor vehicle industry to its present size, so all industries prosper to the degree that they co-operate with each other in research work. The day seems past when single inventions count as they did in the past. Most new things are now an offshoot of something that is older.

The automobile followed the locomotive as a vehicle in general use. The research work done in the automotive field made the present airplane possible, the research work done in aeronautics led to the present high speed streamlined trains. The net results of research work form an upward spiral. All who take part in it prosper. All find new demand for their products and usually an increase in profits.—J. E. Bullard.

TECHNICAL NOTES

(Continued from page 318)

annulation of the undamaged wool fiber in caustic soda solution shows that, even while upon the living sheep, exposure to light has already taken place, with its consequences; since even one side of the single wool fiber, more exposed to light than its under side, dissolves more quickly in caustic soda solution, than the "shaded" side of the fiber. Wool which has been strongly altered by light will dissolve even in hot water. It appears that the point of attack in the wool fiber is provided by the free amino groups. This explains the detectible presence of free sulfuric acid in samples of wool strongly affected by light, since the hydrogen sulfide split off from the sulfur of the wool "molecule" by the degradative action of light is at once oxidized to sulfuric acid.

The sensitivity of a dyeing to light depends primarily upon the structure of the dyestuff molecule, but to some extent also upon the nature of the fiber carrying it, as well as upon certain substances possibly present as finishing agents, or still present from some previous treatment. As to the dyestuffs, the hydroxyl, and the amino and imino groups seem to make the molecule more susceptible to the action of light. It is of deliberate purpose, for sufficient reasons, that these groups appear generally in a dyestuff, more or less substituted, it may be, or condensed with other

reactive substances, whose condensation with these groups has power to diminish their sensitivity in some directions, though their presence in the dyestuff lends various valuable properties to it.

One striking fact is the power possessed by some dyestuffs, of transforming incident light of long wavelength into that of much shorter wavelength, thus aggravating the effect of the total irradiation.

The effect of light upon dyed fabrics can be depressed or accelerated by various substances, as is generally true in most chemical reactions. The presence of many metallic compounds, such as are present in, or form the basis of, many mordants, or iron or manganese from bad water, or even titanium dioxide, deliberately introduced to deluster rayon, etc., is known to accelerate the breaking down of the fiber substance. Mixtures of certain dyestuffs have the same effect. In some cases, chromium and copper compounds, in union with certain dyestuffs, exert a strong protective action.

Temperature has some influence upon the process, heat, as would be expected, producing an acceleration of the process. The presence of moisture accelerates the action of the short-wave range still more decidedly.

Sulfuric Acid and Sulfates in Wool

L. Armand—TIBA 15, 283 (1937).—A review of the subject, mostly along analytical lines, with several references to important work already done by others upon the subject. In his closing paragraph, the author expresses the belief that the determination of the total sulfur content of wool is of no significance, owing to its very variable value.

Difficulties in Dyeing Vat Dyestuffs in Standing Baths

J. Lanzer—Mell. Textil-Ber. 18, 626 (1937).—A careful discussion of the difficulties met with, and the principles to be observed, in dyeing Indanthrenes from a standing bath. Although the Indanthrenes (many of them are definitely named) are the only dyestuffs discussed, yet the paper may be worth reading by those who employ the same group of colors under other names.

One table and one graph are included.

TRADE NOTES • NEW PRODUCTS

• CARBIC RELEASES

Carbic Color & Chemical Co., Inc. 451 Washington Street, New York, N. Y., announces release of the following circulars:—

Indigosol Green I3G—for dyeing. A new dyestuff which is characterized by its clear, yellowish green shade and high fastness properties. It is stated that the excellent fastness to light is of value for curtains and hangings and the good fastness to washing, chlorine and peroxides for styles usually laundered. If the customary precautions are observed it is also suitable for colored bleaching. It is claimed that the product is easily soluble, possesses low substantivity and is very suitable for the padding of piece goods. On mixed fabrics and yarns of cotton and viscose or staple fiber, it is said that good union dyeings are obtained on the pad whilst in dyeing, the rayon turns a little darker than the cotton. Satisfactory dyeings are also said to be obtainable on unweighted silk. Circular Sol. 68.

Indigosol Green I3G—for printing. It yields a clear yellowish shade, said to be distinguished by excellent fastness properties and which can be resisted by the usual printing resists or discharged in pale dyeings with alkaline Rongalite C discharge. On cotton, rayon and mixed fabrics it yields a considerably more yellowish green than Indigosol Green IB and the shades are said to combine excellent to maximum fastness to light with very good fastness to washing and chlorine. The Indigosol Developer, chlorate and nitrite processes are the most suitable for developing, but the chromate process may also be used for mixtures of Indigosols and Rapidogen dyestuffs. Circular Sol. 69.

• BLICKMAN BULLETIN

S. Blickman, Inc., Weehawken, New Jersey, has recently issued a bulletin entitled "Stainless Steel Equipment" which is No. 4 of a series of bulletins on stainless steel equipment. Featured in this bulletin are: rectangular dye tanks; steam jacketed kettles; cylindrical tank with conical bottom and numerous other items of stainless steel for plant modernization including trucks; dry cans; dye jig tubs; vats, tanks and tubs and oval reels. The Blickman organization is a pioneer in the production of equipment from stainless steel and will design special equipment to meet individual specifications. Copies of the bulletin are available upon request.

• CAROLINA ANALYTICAL LABORATORIES

Announcement has been made of the formation, some months ago, of the Carolina Analytical Laboratories located at 2316 South Boulevard, Charlotte, N. C. It was formed to serve various industries in the South. It is reported that the textile, as well as a number of other industries, are taking advantage of their complete laboratory facilities for analytical work, physical testing and chemical engineering consultation. Norman G. Sixt is chief chemist of the laboratories and all work is conducted under his direct supervision.

• CIBA REVIEW

Number 9 of the *Ciba Review* has recently been distributed. The theme of this number is "Dyeing and Tanning in Classical Antiquity." Contents of the issue are described by the following titles: Chronological Table; The World of Greece and Rome; Dyeing in Greece; The Roman Dyers; Dress and Dress Materials in Greece and Rome; Greek and Roman Tanners; Historical Gleanings. Included with this issue is a supplement entitled "Ultravon K." The product is intended for use in preventing lime soap faults such as level dyeing difficulties, tendency to rubbing, cloudy dyeings, flat shades, harsh handle and unpleasant odor of stored goods. There is also a supplement entitled "Chlorantine Fast Green 5 GLL" which gives directions for its use on cotton and on viscose rayon crepe and cotton-viscose rayon materials.

• JOINS CROWN OIL PRODUCTS

Crown Oil Products Corp. of Long Island City, N. Y., announces that Sylvester R. Kaas has joined their staff as technical director. He was formerly associated with the Atlas Refining, Inc., in a similar capacity.

• SOCMA MEETING

The regular monthly luncheon meeting of the Synthetic Organic Chemical Manufacturers Association of the U. S. was held at the Chemists' Club, New York City, on Thursday, May 12th, 1938. It was announced that the next meeting would not be held until the middle of September

unless some special occasion should indicate it necessary.

• GENERAL RELEASES

General Dyestuff Corp., 435 Hudson Street, New York City, announces release of circulars describing the following products:

Vegan Salt A—an auxiliary for the dyeing of mixed yarns and fabrics of spun rayon and wool, or cotton and wool. It is said to prevent the reduction by boiling, experienced with a number of direct dyestuffs and neutral dyeing wool dyestuffs. Furthermore, it is said to prevent the gradual decrease in depth of rayon or cotton mixed with wool which occurs in longer boiling. Therefore, it is claimed, it produces a greater reliability in matching mixed fibers. Circular I.G. 1471.

Fastusol Blue LBL—a direct dyestuff said to possess excellent fastness to light and good fastness to alkali, acid and rubbing. It is said to level very well and to be easily soluble. It is also recommended by the manufacturers on account of its excellent dischargeability. Circular I.G. 1443.

I.G. Waxes in the Textile Trade—a circular giving the consistency, melting point, saponification figure and unsaponifiable matter of the IG waxes in comparison to natural waxes, as well as formulae for showerproofing, finishing sizes, etc. Circular I.G. 1487.

Naphtamine Light Brown TWC Conc.—a direct color which produces very deep tobacco shades on cotton and rayon and is said to dye good unions on these fibers and also silk and wool, leaving acetate rayon a very clear white. Circular GDC 149.

Rapidogen Orange IGN—a new orange said to be of excellent fastness properties with a very bright shade. In contrast to the older Rapidogen Orange G, this brand will not change shade in prolonged washing; further it is said to have excellent fastness to light and chlorine. Circular I.G. 1482.

Chrome Yellow D—a new brand manufactured by General Aniline Works and offered to the trade by General Dyestuff Corp. It may be dyed after-chromed, on a chrome mordant and according to the chromate process. It is said to exhaust well when dyed by the silk-white method and to leave acetate rayon effects clean. It is further said to dye level and that it may be used for all kinds of combination shades. Circular G-168.

Algosol Green I3G—for dyeing, a new addition to the water soluble vat dyestuffs which, it is stated, will be of considerable interest for the production of bright yellowish shades of green possessing excellent fastness to light and very good fastness to chlorine and washing. It is claimed that it has good solubility and being of low substantivity is well suited for the padding of cotton piece goods. It is said that on mixed fabrics of cotton and viscose or spun rayon, good unions are obtained in padding. In dyeing, however, the rayon dyes a little darker than the cotton. This new product is best applied by the nitrite process in dyeing. Circular Sol. 68.

Algosol Green I3G—for printing, which produces a clear yellowish shade said to be of excellent fastness properties. It is stated that the product can be resisted with the usual printing resist or discharged in pale shades with alkaline Rongalite C L discharge. It can be printed according to the chlorate and nitrite process and also according to the neutral chromate-acid ageing process alone or in mixture with Rapidogen Yellows. Circular Sol. 69.

• BLICKMAN MODERNIZATION

S. Blickman, Inc., Weehawken, N. J., fabricators of Stainless Steel Equipment for the Textile and Dyeing Industry, has just installed several new departments and added new equipment in their plant.

In line with its general policy of utilizing the latest technical advancements, its welding, grinding, polishing and machine departments are now equipped with the most modern and up-to-date facilities, for the fabrication of equipment in Stainless Steel and other alloys.

The plant area with its increased manufacturing facilities, is now more than 150,000 square feet.

PLANT OF THE BLICKMAN COMPANY

• du PONT RELEASES

E. I. duPont de Nemours & Co., Inc., Wilmington, Del., announce the release of the following new products:

"Ponsol" Golden Orange YL Double Paste—the latest addition to the du Pont range of anthraquinone vat dyes, it yields yellowish shades of orange on cotton and rayon in all forms. It is a trace redder and duller than "Ponsol" Golden Orange G Double Paste and is in physical condition for application in all types of dyeing apparatus, being particularly recommended by the manufacturers for pigment-pad work. The new color is said to be resistant to light, chlorine, washing and power laundering with chlorine and to change only slightly in tone when given the usual soaping finish.

"Avitex" R—a new finishing agent designed primarily for use on acetate and rayon fabrics. It is also employed to some extent on cotton materials, and it is of interest on raw stock to improve the spinning properties. It is said to possess an advantage in exhausting from solution from a long bath onto the fiber and in being resistant to subsequent rinsing, giving a soft, full finish. It is also said to be resistant to hard water, hot ironing, and hot calendering, and to be stable under storage conditions.

It is stated that the finish leaves materials free from odor and not discolored, and has no deleterious effect on the light fastness or on the shade of dyestuffs, a factor of importance in finishing synthetic fiber materials.

• REPRESENTS ONYX

The Onyx Oil & Chemical Co., Jersey City, N. J., has appointed Alfred Brandt as sales and technical representative in charge of its Cuban territory.

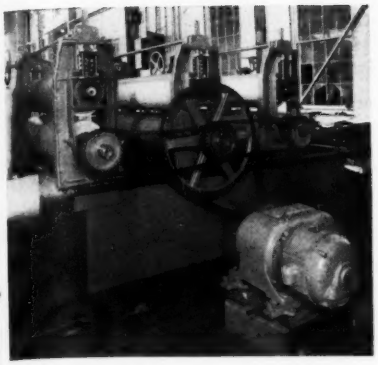
Mr. Brandt, who recently joined the Onyx organization, is well-known among mills both in the United States and Cuba. He has a long and thorough experience in all branches of textile processing and finishing.

Mr. Brandt has established headquarters at Havana, conveniently situated for prompt service to Cuban mills.

• OPEN WIDTH WASHER

The New "Fleet Line" Open Width Washer, made by Riggs & Lombard. Inc., Lowell, Mass., is designed to run in tandem with and at the delivery end of the "Fleet Line" Progressive Jig described in these columns some time ago. Like the latter machine it is used for processing heavy cotton fabrics such as collar cloth, gabardines, heavy drills, twills, ducks, etc., which should not be roped up in a kier where they would be permanently creased.

It is ordinarily built with three compartments, the first for soaping and the second and third for rinsing. Excess water



is squeezed back into the baths by nip rolls and the pressure of these rolls can be regulated or released by the same hand wheel.

Squeeze rolls are motor driven through sprockets and chains.

A drain valve is located at the front of the machine.

The normal capacity of the machine is about 30 yards per minute.

The kettle is furnished in boiler steel or stainless steel as desired.

• MAY TEXTILE RESEARCH

The May issue of *Textile Research* contains further reports upon two basic scientific researches of The Textile Foundation; one by Werner Bergmann on "A Study of the Composition of the Ether Soluble Fraction of Raw Silk," and the other by Philip Burdett on "Fundamental Properties of Textile Wastes. III. Gas Bubbles." It also reprints from *Mechanical Engineering* a notable report on "Temperatures in Drying," by B. R. Andrews of Andrews & Goodrich, Inc. The article by Edward R. Schwarz, professor of textile engineering at M. I. T., which appeared in the April issue of *Textile Research* under the title "Simplifying the Simple," and which mentioned in this connection the use of "S" and "Z" to define so-called left- and right-hand twist single yarns, is commented upon by W. H. Whitcomb, secretary of Committee D-13 of the A.S.T.M.

• "COLOR-TESTED" SEAL

The new program for the identification of color fastness in textiles has been further extended through the award of the "Color-Tested" seal to a new line of slip cover and drapery fabrics. This blue and gold seal is being affixed to fabrics which pass color fastness tests in the Better Fabrics Testing Bureau, official laboratory of the National Retail Dry Goods Association. All tests are based on the use to which each type of material will be put when in actual consumer service. The award of the seal is not confined to fabrics colored with a particular make of dyestuffs, but depends entirely on the fastness of the dyes used and their ability to hold their color when subjected to laboratory tests.

The arrival of these slip covers and drapery fabrics with the "Color-Tested" seal is significant as the first step in a revolutionary movement which is expected to answer the urgent need for a means of color-fastness identification. Until now, with few exceptions, the consumer has had no way of knowing whether or not the colors in fabrics are fast, irrespective of the price she pays.

It is stated that, on these new fabrics, which are the Ardmore line of cotton crash manufactured by Marshall Field & Company, this identifying mark of color fastness assures the purchaser that they are fast to home washing and commercial laundering and will stand exposure to sunlight—treatments which they will normally undergo when used.

It is expected that other decorative fabrics bearing the "Color-Tested" seal will shortly be available and that eventually dress fabrics will also appear with this label of color reliability.

• CALCO RELEASE

Calco Chemical Company, Bound Brook, N. J., has released a sample book of the following title:

Calco Dyes on Unions—a discussion of union dyeing in general is presented and dyed patterns of such Calcomine, Calcodur and Calcocid dyes as are most suited for dyeing unions in a neutral bath are shown. The unions discussed are in the main made up of wool and cotton, or rayon but which may contain silk and acetate rayon and the general reactions of the dyes toward these fibers are indicated. Also given are methods for the preparation of the goods for dyeing and dyeing. There are listed a number of faults which may occur in dyeing and their probable causes. Among the faults listed are: mill or washer wrinkles; uneven dyeing; bronziness; cockles; lack of uniformity in the finished shades.

The dyed patterns are unique in the manner in which they present the effect of the dyes. They are made up approximately of 50 per cent wool and 50 per cent cotton with floaters of acetate rayon, rayon, silk, cotton and wool and show the behavior of each dye at 160° F. and at the boil, toward these different fibers, dyed in the same bath with the addition of 10 per cent common salt. There are also samples shown dyed with speck dyes, dyed rayon-wool unions, and dyed cotton warp worsteds.

• CHEMICAL BOOK CATALOG

The 150 page spiral bound Catalog No. 5 listing and describing chemical, bacteriological, pharmaceutical, medical, engineering, electrical and general scientific and other technical books of all American and British publishers, offered to technical workers by the Chemical Publishing Co. of N. Y. Inc., met with such a great demand that it is now out of print. Catalog No. 6 is now ready and will be mailed to any chemist, engineer, scientist or professor sending 10c in stamps or coin to cover mailing.

This catalog eliminates the necessity of filing and looking through catalogs of many tehnical publishers—thus saving a great deal of time and effort.

• ARMCO BOOKLET

Under the title "Dyestuffs & Stainless are Friendly Enemies," The American Rolling Mill Company, Middletown, Ohio, has published an attractive booklet describing the use of Armco Stainless Steels in textile equipment. General recommendations of stainless for various dye solutions are listed.

• MEETING, A.A.T.T.

The May meeting of the American Association of Textile Technologists was held at the Architectural League Club Rooms, New York City, on the evening of May 4th. There were 113 members and guests present for dinner and the lecture which followed. This was the largest attendance ever had at a regular meeting.

The principal speaker of the evening was Mr. Alexis Sommaripa, Manager of Fabric Development of the Rayon Division of E. I. du Pont de Nemours & Company, Inc., who spoke on the subject "Milestones of Rayon Technology."

This address was followed by a report from Mr. Joseph Meierhans on his recent European trip to the various textile centers in England, France, Switzerland, Germany, Czechoslovakia, Austria and Italy.

• COTTON CARNIVAL

Wearing a replica of King Edward's crown, Elray Lewis of Brownfield reigned as queen of the sixth annual Texas Technological College Cotton Carnival May 20. She was elected by popular vote of the student body from among five condidates.

Marching across cotton bales to a cotton throne at the Lubbock High School auditorium, she was crowned by Harold Cocanougher of Lubbok as King Cotton. The queen and her attendants were dressed in cotton frocks.

Style show entrants, who passed in review before the king and queen, displayed sport, street, afternoon, and evening dresses of cotton materials.

This was a part of National Cotton Week, a movement to help popularize cotton fabrics.

Officers and committee heads in charge of arranging the Cotton Carnival were members of Phi Psi, national textile fraternity, the sponsoring organization. Charles Wilson of Tulia, general manager;

Harry Patterson of Athens, assistant manager; Darrell Branton of Ralls, sales manager; Kendall Onstott of Lubbock, queen election and models; J. R. Earnest, of Lamesa, publicity; and Milton Hallmark of Loraine, accountant.

● EIGHTIETH ANNIVERSARY

On May 27th, C. G. V. Sjostrom, President of the C. G. V. Sjostrom Co. of Springfield, Mass. and a resident of Ware, Mass. celebrated his eightieth birthday. He was born in Stromfors, Sweden, the eldest son of Maria and Ludwig Sjostrom. When

he was ten years old his father moved his family to Sherbrooke, Canada. He received his early education in the public schools of Sherbrooke and at St. Francis College, Richmond, P. Q. He then entered the employ of the Paton Manufacturing Co. and was taught the art of dyeing under the tutelage of his father. In the early eighties he came to the United States and took his first position as Overseer of Dyeing with the Ed. Harris Woolen Mill in Woonsocket, R. I. In 1885 he married Ella Rhodes and moved to Providence, R. I. where he became employed by the Valley Worsted Mills. In 1894 he moved to Lawrence, Mass. where he and his father. Ludwig Sjostrom, started the Lawrence Dye Works which later became a division of the United States Worsted Mills. After selling out his interest in the Lawrence Dye Works he accepted a position with the Geo. H. Gilbert Mfg. Co. of Ware, Mass. In 1919 he resigned this position and with his son, F. L. H. Sjostrom, started the C. G. V. Sjostrom Co. in Springfield where for almost twenty years now he has been actively engaged in the manufacturing and distribution of Dyestuffs, Chemicals and Specialties and a consultant on Dyeing and Finishing problems. At the present time he has two sons associated with him—Raymond B. and F. L. Harold. His other son, C. G. V. Sjostrom, Jr. is a designer with the Peerless Woolen Mill of Roseville, Ga. His only daughter, Mrs. P. S. Bassett resides in Springfield.

Many of his old friends in the Textile Business, John Linehan, Jos. E. Cole, D. W. Senior, R. G. Schooler, John Sherriffs, Andrew and Archibold Paton, Joshua Pierce, Joe Phillips, Arthur Merritt, Birger Rosentwist, Tom Ashley, Win Taylor, F. E. Atteaux, W. C. Durfee, H. A. Motz, Geo. Gilbert, Mawson and Goodhue have all departed, but he derives much pleasure in meeting and reminiscing with those few that are left and takes advantage of every opportunity to see them and enjoys having them drop in to call on him.

Ever since he has been in business in Springfield he has continued to live in Ware and has travelled the round trip every day for almost 20 years, and figures he has consumed over 200,000 miles of travel from home to office during that time. He is just as active to-day as he was twenty years ago, but of late years he has not gone out much among the trade. He has been a member of the Drysalter's Club, Engineers Club, a Mason and a Shriner, and a charter member of American Association of Textile Chemists & Colorists.

● APPROVAL SEAL

The American Institute of Laundering has announced that its Laundry-Tested and Approved Seal has been awarded to Seamans & Cobb Company of Hopkinton, Massachusetts, for Marking or Insignia Cotton as well as sewing threads. The approval involves color fastness.

All threads issued by Seamans & Cobb Company, including both stock numbers and special colors, will be laundry-tested monthly. The Institute explains that due to the present lack of standards, no attempt at present will be made to evaluate factors such as strength and elasticity. Definite determination of color fastness is, at present, the important step. Research will be started to see if proper standards for other factors can be worked out.

Because of the laundry's close interest in the industrial dress, uniform, sport dress, work and sport clothing fields, the American Institute of Laundering is attempting to accelerate its work among the findings going into garments and other linen supply items. Much work has already been done on fabrics, buttons, towels, sheets and blankets . . . and now marking and sewing cottons.

● COTTON RESEARCH LABORATORY

Endeavors are being made by a Texas State-wide cotton committee to establish in that State a $1,000,000 laboratory which the Department of Agriculture will soon designate for location in the South.

This laboratory would be devoted to finding new uses for cotton and its by-products. A carryover of 13,000,000 bales of cotton is in prospect for August, 1938. Estimated domestic consumption for the current season is 6,250,000 bales compared with 7,768,000 for 1936-1937.

It is understood that the efforts of Texas interests are well supported in Congress and it is believed that Texas is in a good position to secure the laboratory provided for in the 1938 Farm Bill.

● TRIMETHYLAMINE

Röhm & Haas Co., Inc., 222 W. Washington Square, Philadelphia, Pa., has recently developed an improved process for the preparation of trimethylamine, either in the anhydrous (gaseous) state or in aqueous solutions. For this reason trimethylamine is now the cheapest organic base available. Their process gives a product of unusually high purity,—averaging close to 98%. Because of its high strength it forms salts that are neutral or slightly alkaline. The carbonate, phosphate, stearate, silicate, sulfate, lactate, and several other simple neutralization products are stable.

It is stated that trimethylamine has many possible commercial applications. It can be recommended for the saponification of oils, fats and waxes, esters, and gums. It is said to be particularly adaptable to the synthesis of new accelerators, anti-oxidants, antiseptics, disinfectants, detergents, and pharmaceuticals. Its strength, its purity, and its low cost are said to compel the consideration of its use in many other fields.

This amine is now available in commercial quantities, and is another member of the series of organic amines and quaternary ammonium bases which this company is manufacturing.

● ALBASOL

Development of Albasol No. 1, a new type soaking treatment for deep pebble rayon crepe, has been announced by Charles P. Gulick, president of the National Oil Products Co., Harrison, N. J.

In announcing Albasol, Mr. Gulick pointed out that the consistent production of a deep heavy pebble on rayon crepe yarns was a problem for throwsters.

"In order to remedy this situation," he explained, "The NOPCO laboratories have focused their efforts on this problem. Gratifying results were obtained with the development of Albasol No. 1. In carrying out this work, a number of experimental laboratory products were further tested in repeated trials of actual mill practice. In each case, Albasol No. 1 was outstanding in consistently producing an unusually deep, uniform pebble. The experimental trials have since been borne out by results obtained in regular production."

● T. R. I. ELECTION

The Throwsters Research Institute has announced the election of the following officers for the 1938 term: William R. Rossmassler, Sauquoit Silk Mfg. Co. president; Neil V. Butler, Richard V Butler, vice-president; Arthur G. Schautz, Grove Silk Company, treasurer; George A. Urlaub,

executive director, and the following new board members: Lee Havey, Van Straaten & Havey; John B. Kingsley, Mid-Valley Silk Company; Nathan Lewis, Kahn & Feldman, which, together with the following members, constitute the 1938 Board of Governors: Alfred L. Coradi, Paragon Textile Company; George Friedlander, Duplan Silk Corp.; T. F. N. Gray, Lehigh Valley Throwing Mills; Paul Hemmerich, Duffy Silk Company; R. K. Laros, R. K. Laros Silk Company; E. J. Schellenberg, Atwater Silk Corp.; H. V. W. Scott, Van Raalte Company; Joseph Simpson, Columbia Silk Throwing Company; Henry J. Tynan, Tynan Throwing Company.

• TESTS ON SODIUM ALGINATE

Recent laboratory tests made at the Lowell Textile Institute on the use of Sodium Alginate as a surface agent in dyeing show, according to the Kelco Company, that Sodium Alginate has other distinctive advantages in the textile field in addition to its recognized value as a thickening agent in neutral and alkaline printing pastes. The following is a summary of results:

A series of tests were run using Sodium Alginate (1) as the protective agent of wool and rayon fibers from the damaging effect of the alkali in vat dye baths; (2) as a fiber protecting agent in dyeing wool and cotton mixtures with Union dyes (3) as a leveling agent in dyeing of cotton with Vat dyes; and (4) as a leveling agent in dyeing of cotton with Direct dyes.

In the first test, three dyeings were made with a Vat dye on cloth containing 70% Wool—30% Viscose. The first sample was the control with no protective agent; the second and third samples contained the same amount of dye and other ingredients as the control, with 2.0% competitive protective agent added to the one and 2.0% Sodium Alginate (Keltex) to the other. The dyeing procedure carried out on all samples was identical.

The wool and rayon threads were separated for comparison of color value. The wool fibers in all samples were practically the same but the dyeing of the rayon fibers was said to be improved by the Sodium Alginate. Tensile strength tests showed 43 lbs. for the control, 45 lbs. for the competitive protective agent and 49 lbs. for the Keltex.

Three dyeings also were made in the second tests using a Union dye on cloth containing 50% wool and 50% cotton, with one control and two other samples using the same protective agents as above. While the first two samples showed uneven dyeing, the Sodium Alginate sample was said to be dyed evenly and to show better color value than the other samples. Tensile strength tests were: Control, 45 lbs.; competitive protective agent, 47 lbs., and Keltex, 49 lbs.

In the third test, three different Vat dyes were used on cotton cloth, with one control and two baths to which Sodium Alginate was added (2.0% in one and 0.5% in the other). In all cases the color value of the Sodium Alginate samples was said to be better than that of the control. The 2.0% Sodium Alginate samples were better than the 0.5% samples.

It is claimed that these results also show that Sodium Alginate is an excellent thickening agent to use in the Pad method of Vat dyeing.

The three dyeings, in the fourth test, using a Direct dye on cotton yarn are said to show that Sodium Alginate had very little, if any, effect on the dyeing of yarns. However, as Sodium Alginate does not coagulate the dye or reduce its efficiency, this test, it is claimed, indicates that Sodium Alginate can be used satisfactorily as a print paste thickener with Direct dyes.

• CALCO ADDS TO SALES STAFF

The Calco Chemical Company, Inc., of Bound Brook, N. J., announces that, effective June 1st, Mr. J. A. Kilcommons and Mr. R. C. Morrison, formerly with John Campbell and Company, will join the sales staff at Providence, R. I.

Mr. M. A. Stough and Mr. M. L. Kirby, both formerly with John Campbell and Company, have recently joined the sales department at Charlotte, N. C.

• TO EUROPE

Mr. Edward Rosendahl, Vice-President and General Manager of the Glyco Products Co., Inc., 148 Lafayete St., New York, N. Y., is leaving for a business trip to Europe on the S.S. "Ile de France" on June 22nd.

Mr. Rosendahl will visit the Glyco Products Co.'s representatives, Marcel Quarre et Cie in Paris, Rex Campbell & Co., Ltd., in London, Industrie Grondstoffen Maatschappy N. V. in Rotterdam and E. Landerholm in Stockholm, with a view of obtaining first-hand information on the European market.

• CIBA RELEASES

The following circulars and sample cards have recently been issued by the Society of Chemical Industry in Basle, represented in the U. S. A. by the Ciba Co., Inc., and in Canada by the Ciba Co., Ltd.:

Cloth Fast Brilliant Blue R—a new type in the series of Cloth Fast Colors having a decidedly redder and purer tone than the G type. This new dyestuff is recommended by the manufacturers for lightly fulled goods and fast knitting yarns, on account of its good fastness to light, washing and sea water. On account of its resistance to chroming, Brilliant Cloth Fast Blue R may be used for shading chrome mordant dyestuffs, especially in the half-wool-chrome process for union goods and mixtures of wool and cut staple fiber. This product is also of interest in the printing of wool and silk. Circular No. 472.

Diazo Fast Blue 4BW—a new member of the Diazo Fast series, which is said to be noted for its fastness to light and washing. Diazo Fast Blue 4BW is said to be suited for the dyeing of all combinations of cotton and viscose rayon; the shades are dischargeable to a pure clear white. Circular No. 473.

Rigan Sky Blues 2G and 4G patented—these new types augment the present series of Rigan Colors, which are offered to the trade for the purpose of dyeing level shades on viscose rayon of unequal affinity. The new types dye on viscose and Bemberg rayons, pure greenish toned blues which are suitable as self colors, or for the production of bright greens in combination with Direct Yellow 5G conc. Cotton and viscose rayon combinations are said to be dyed uniformly in light shades and acetate rayon is reserved pure white, even in large effects. Circular No. 475.

Lyofix DE—a new textile auxiliary of the Sapamine KW class. This new product is recommended by the manufacturers particularly for the after-treatment of direct dyeings to increase their fastness to water. Direct dyeings, after-treated at 85-95° F. for ½-hour with 1-4% of Lyofix DE, are said to be considerably improved in their resistance to water. The circular is illustrated by many samples showing the effects obtainable by the use of Lyofix DE. Circular No. 476.

Kiton Fast Red BGLE (pat. applied for)—an easy levelling acid dyestuff said to be of very good fastness to light, which is useful not only as a self color, but also in combination with the other easy levelling fast acid colors. Viscose and acetate rayon effects are said to be reserved pure white and the dyeings are easily dischargeable to a pure white with hydrosulfites. Circular No. 478.

Rosanthrene and Diazo dyestuffs on Woolstra piece goods—(Woolstra = 70% wool, 30% cut staple fiber). This card illustrates the range of dyestuffs first alone, then in combination with similar shades of the neutral dyeing Cloth Fast Colors which will withstand the diazotizing process. Shades made in this way on Woolstra pieces or yarns are said to have the advantages of fastness to water, washing, perspiration and damp pressing. The further addition of small amounts of selected Chlorantine Fast Colors to the orange and red shades will give a noticeable improvement in the light fastness of the vegetable fibers, without lessening the fastness to washing. The one-bath dyeing method shown in the card is said to furnish uniform shades in a much simpler manner than the usual two-bath dyeing method. Sample Card No. 1472.

Neolan Colors in Printing—this card illustrates 39 Neolans printed on slightly chlorinated mousseline de laine (wool muslin). Most of the Neolans may be printed by this method, either with or without chrome acetate or organic acids and the most appropriate method for each type is indicated. In printing on unchlorinated wool materials, fixation with Sapamine KW is said to give the best results. Prints on wool with the Neolans are said to be characterized by good fastness to light, perspiration, water and washing. Sample Card No. 1485.

Acid Dyestuffs on Woolen Pieces—this card illustrates type dyeings of the well-known Acid, Kiton, Kiton Fast, Acid Alizarine and Cloth Fast colors in three different strengths. In this new card arrangement has been made so that the dyeings, a short description and the fastness tables may be seen at a glance without the necessity of turning to another page. Furthermore there is separate tabulation of all the dyestuffs with their various properties. Sample Card No. 1500.

Rosanthrene and Diazo Colors which reserve Acetate Rayon—these dyestuffs are recommended above all for fabrics containing small effects of acetate rayon, because in such cases there is a possibility of the acetate fiber being affected by the diazotizing and developing process, to the detriment of the white reserve effect. For developers, there have been used beta naphthol and yellower developer C, also resorcin for black shades, because meta-toluylene-diamine and para-phenylene-diamine being absorbed, are likely to turn brownish later on account of their oxidation. The white effects on the acetate rayon may be made permanent by a short soaping after the developing, with a 0.1% soap solution at 120° F. Sample Card No. 1509.

Chlorantine Fast Colors—this series of cards is identical except that 1510 shows mercerized cotton, 1510a ordinary cotton and 1511 viscose rayon. The series of Chlorantine Fast Colors has been enhanced by the addition of a number of new types said to be of exceptional fastness to light. It is stated that the Chlorantine Fast Colors make possible the dyeing of shades fast to light in the simplest possible way; they are therefore suitable for the dyeing of yarns, drapery fabrics, upholstery goods, knit fabrics, as well as for piece dyeing, the dischargeable types being especially adapted for discharge printing. Sample Cards No. 1510, 1510a, 1511.

• du PONT DISPLAY

The important part that products of the chemical manufacturing industry have in the field of fashion was presented in the Easter displays at the Du Pont Exhibit on the Boardwalk at Atlantic City. Practically every display featured the application of one or more du Pont products in clothing and dress accessories. One of the largest crowds in recent years visited the Exhibit during Easter week. The management reports that more than 40,000 persons visited the displays. On Easter Sunday alone, the attendance exceeded 14,000.

The displays featured included fabrics and completed costumes of Du Pont Rayon and "Acele" acetate rayon; "Cellophane" cellulose film in high fashion millinery; Du Pont plastic materials in slide fasteners, handbag frames, umbrella handles, and scuffless heels on shoes; "Fabrikoid" pyroxylin coated fabrics in handbags; R. & H. Peroxide bleaches used in the finishing of women's felt and straw hats and men's felt hats; Du Pont dyestuffs applied to fabrics and leathers, and Grasselli chemicals used in the production of white washable leathers.

The important roles of "R. & H." Peroxide Bleaches in fashions, in obtaining an even dye base for hat materials, was shown by displays of Dobbs hats of felt for men, and Dobbs hats of felt and straw for women. The use of Grasselli chemicals in the production of white washable kid and goatskin was exemplified in a display of shoes and handbags of leather from G. Levor & Co., Inc.

The wide application of Du Pont dyestuffs was shown in exhibits of textile fabrics from R. W. Bates Piece Dye Works Inc.; kidskin leathers for shoes from Allied Kid Company; and fashion fabrics of rayon, silk and combinations of yarns, from Printex Corporation.

• ANNUAL MEETING, T.C.C.A.

At the twenty-third annual business meeting of the Textile Color Card Association, held on April 28th at the offices of the organization, 200 Madison Avenue, the following directors were elected for the coming year:

Charles Pinnell, Merrimack Mfg. Co., Roy E. Tilles, Gotham Silk Hosiery Co., Armand Schwab, Armand Schwab & Co., Carl E. Kempf, Brewster Hat Co., Inc., William Hand, John Hand & Sons, E. Irving Hanson Sr., Allan C. Jacobson, Sr., J. P. Stevens & Co., W. R. Mac Intyre, Joseph Bancroft & Son, Brainerd Pidgeon, Stunzi Sons Silk Co., J. Laird Schober, Laird Schober & Co., and Alfred L. Simon, Alfred L. Simon & Co.

All of the above directors were re-elected, with the exception of Messrs. Mac-Intyre and Pidgeon, who served on the Board for the first time. They succeeded Philip Johnson and Godfrey Conze, resigned.

At a meeting of the directors held immediately after, the following officers were re-elected:

President: Charles Pinnell (General Sales Manager, Merrimack Mfg. Co., formerly President Fred Butterfield & Co.), 1st Vice-Pres.: Roy E. Tilles, (President, Gotham Silk Hosiery Co.), 2nd Vice-President: Armand Schwab, (President, Armand Schwab & Co.), Treasurer: Carl E. Kempf, (President, Brewster Hat Co.) and Secretary and Managing Director: Margaret Hayden Rorke.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED: Finishing plant chemist desires responsible position. Expert on vats, napthols and other cotton and rayon dyeing. All types of control work and testing. 26 years' experience on yarn and piece goods. Write Box No. 993, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED:—Experienced Dyestuff Salesman and Demonstrator now employed wishes to make change. Understands all types dyestuff including Naphthols. Would consider taking charge dye house or lab. New England preferred but would go anywhere. Write Box No. 128, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED:—Ten years experience in dyestuff laboratory. Experienced with all types of colors and materials. Pratt graduate. Age 29; single. Write Box No. 129, American Dyestuff Reporter, 440 Fourth Ave., New York, New York.